The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Contents

NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Wembley

THE opening on Wednesday by the King of the British Empire Exhibition made as impressive a spectacle as any of the kind in our history. Some 120,000 persons filled the great Stadium, and the setting for the ceremony was perfect. Most impressive of all was the reproduction by loud speakers of the King's speech, with the result that people at the most distant points heard as plainly as if they had been sitting within a few yards. The King's reply to the address which the Prince of Wales read was admirable both in substance and in expression. "We believe," he said, "that this Exhibition will bring the people of the Empire to a better knowledge of how to meet their reciprocal wants and aspirations, and that where brotherly feeling and the habit of united action already exist the growth of inter-imperial trade will make the bonds of sympathy yet closer and stronger. Business relations between strangers may or may not lead to friendship; co-operation between brothers for the better development of the family estate can hardly fail to promote family affection. And we hope further that the success of the Exhibition may bring lasting benefits not to the Empire only, but to mankind in general. No nation or group of nations can isolate itself from the main stream of modern commerce, and if this Exhibition leads to a greater development of the material resources of the Empire and to an expansion of its trade it will at the same time be raising the economic life of the world from the disorganisation caused by the war."

Splendid as the ceremonial opening was, one could not avoid some feeling of regret, in looking at the unfinished Exhibition itself, that the opening date had so far preceded the completion of the work. For the truth is that the Exhibition is still in a rather rough condition, and a few weeks must elapse before its real size, character, and design can be properly appreciated. It has been an enormous task, however, to bring it to its present condition, and in the face of what has been accomplished one may easily forgive the omissions. The explanation probably is that the work always seemed a little bigger than the people in charge of it, with a few distinguished exceptions like that of the architect, and some of the departments were not too gifted with imagination. The publicity arrangements, judging by our own experience, were far from adequate, and it was a little vexatious on the opening day to be directed by officials in half a dozen different directions when one inquired for a particular place. These blemishes, however, were dwarfed, as we have said, by the great idea of the Exhibition itself, and will disappear as the stage of completion is approached.

The Chemical Section, though still unfinished, attracted nothing but favourable comment, and a fortnight hence, when everything is in its place, should look extremely well. Here at any rate one can speak with unqualified praise of the management. Mr. Woolcock, in his strenuous career, has never worked harder, and has been splendidly supported on all sides; Dr. Levinstein can look with satisfaction on the results of his work as chairman of the Scientific Section; and the exhibitors have spared no pains to make the Chemical Section worthily representative of British chemical industry. Those of our distant readers who will not have many opportunities of visiting Wembley may be advised to defer their first inspection for at least a fortnight, for at present the collective effect is considerably broken by the large amount of work still in progress. When all this is finished Wembley will indeed be a wonderful spectacle.

Sulphur Removal by Steaming

THE problem of eliminating, or at least reducing substantially, the sulphur in metallurgical and other coke seems to have proved as obstinate as the same problem as is met with in the case of certain oils distilled from shales. With both substances frequent, but usually exaggerated, claims have from time to time been made by enthusiasts who have given a good

deal of attention to the matter, but systematic trials of the suggestions made have usually proved that some point or other has been overlooked. The problem as it is related to shale oils is of unusual interest, but it is greatly transcended in importance by the question as it is related to coke, for in the latter case if a really practical solution were to be found it would point the way to the utilisation throughout the world of enormous reserves of high-sulphur coals which for this sole reason are not suitable for coke-making. Many processes have been introduced with a good deal of promise in this country, and we have in mind the so-called dry-quenching systems which some few years ago seemed likely to become popular, but practical and mechanical difficulties of operating the process led more or less to its discontinuance. It is, of course, scarcely necessary to point out that the sulphur in metallurgical coke in particular is directly responsible for many problems and difficulties in furnace operations, and it is generally held that a content of more than 1¼ per cent. of sulphur is likely to produce an inferior grade of iron, in addition to making it difficult, if not impossible, to work the metal.

Coal washing has proved of undoubted benefit in some cases, but sulphur is in many instances present in peculiar and remote combinations which render mere mechanical separation of no avail. Bearing this fact in mind, the workers at the Pittsburgh Experimental Station have recently been conducting experiments to determine the value of effecting desulphurisation by means of steam, and it has been demonstrated that between 10 and 15 per cent. of the total sulphur in the coke may be removed by simple steaming at 750° C., while with alternate vacuum and pressure treatment the desulphurisation is increased to from 20 to 25 per cent. Furthermore, it is believed that the steaming is much more beneficial than the actual sulphur reduction indicates, since the sulphur removal occurs almost entirely from the surface of the coke, and this surface sulphur may be the portion that is easily absorbed by the iron in the blast furnace. It would seem that of the many processes thus far tried, steaming results in the greatest removal and offers the best possibilities for adaption to the coke industry. The question of cost, moreover, should scarcely prove an obstacle, for, as is well known, large quantities of heat on coke-producing establishments are now allowed to go to waste.

A Great Enterprise

THE Society of Dyers and Colourists, the editor (Dr. F. M. Rowe), the Revision Committee, and the large staff of assistants who in varying degrees have rendered assistance, are all to be congratulated on the publication of the *Colour Index* (pp. 370, £5 15s. cloth, £6 10s. De Luxe edition). The word "monumental," so often misapplied, may fittingly be used here to describe a volume which is indeed a monument both of learning and of patience in compilation. The work falls into four sections:—(*a*) Synthetic organic dyestuffs; (*b*) natural organic dyestuffs; (*c*) natural and artificial inorganic colouring matters; and (*d*) general indices. As the large pages fall open the reader has before him at one opening five columns of printed matter headed "Commercial name," "Scientific name—components—formula," "Preparation," "Discoverer—literature," and "Description—properties—mode of application," while liberal space is left under the head of "Notes" for additions which the reader may wish from time to time to make. The entries number 1,316, and the headings under which each is treated indicate something of the immense range and detail of the Index. The matter is set out with great clearness, and the variations of type are helpful distinctions, instead of being, as they too often are, an aid to confusion. The general indices contain the Schultz and the Colour Index numbers of dyes side by side, British and other patent numbers quoted in the work, intermediate products referred to used in the manufacture of synthetic organic dyestuffs, and finally a commercial name index.

Dr. Rowe, in his introduction, explains the general theory of the work. In the number column the index number of the dye is printed in heavy type, and below in brackets is given the corresponding number from the 1914 edition of Schultz's *Farbstofftabellen*. The Colour Index Committee were advised that the inclusion of the latter would be appreciated by many American readers. A complete list is given of the firms whose dyes are described, and the classification of their products is based as far as possible on lists supplied by individual manufacturers. The matter in the column headed "Scientific name," etc., is so arranged that the trade names of the components or intermediate products used in the manufacture of the particular dye can be noted readily by the colour manufacturer. For the benefit of the student, no contracted formulæ have been used, but in every case in which the constitution is known the complete structural formula has been included. Under the head of "Preparation" the general method of preparation is placed first and in typical cases is followed by a more detailed account of a method by which the dye may be prepared. In the column headed "Discoverer" the name of the discoverer is followed by references to the scientific literature up to date. In the column dealing with "Description," etc., the statements dealing with the fastness of dyestuffs and the method of dyeing have been considered carefully by the members of the Revision Committee and are supported by their practical experience. Figures for the absorption spectra have been inserted, together with the name of the dye and solvent with which the determination was made when available, but it is pointed out that all the dyes listed against a particular Colour Index number will not necessarily give identical figures owing to variations in purity, standard, etc.

These notes can do little more than indicate the range of the work and the care which has been expended on it. The work must be seen for its value to be understood. The production of the volume, we understand, has cost upwards of £6,000, and the Society is to be heartily congratulated on the successful completion of so fine an enterprise. The volume is one no one seriously interested in the dyestuff industry could afford to be without, and it may be of use to add that a rule has been imposed that all orders must be accompanied by a remittance.

"Low Temperature Carbonisation"

THE publication a week ago of a volume by the Director of Fuel Research, Dr. C. H. Lander (written in conjunction with Mr. R. F. McKay, of the same Department), calls for some notice, if only for the fact that the subject of the book, "Low Temperature Carbonisation," is one of the most contentious that has exercised the time and thoughts of both technical and commercial men during the last couple of decades. Some of us will still recollect fairly vividly the original schemes of Thomas Parker in the year 1906. Though commercially Parker's proposals were denied success, it may be said that his ideas were largely responsible for raising the subject from a position of relatively limited significance to that of a great national problem. Parker, in fact, though many were inclined to scoff at him, and though his early apparatus was technically imperfect, prompted others to think, and when in the early days of the war the whole question of fuel utilisation had of necessity to be carefully probed, attention was turned by some of our leading scientists to low temperature carbonisation as providing a means not only for the avoidance of the waste attendant upon the consumption of coal in the raw state, but for the production of smokeless fuel and a home supply of motor spirit.

The considerations, both scientific and economic, which are involved in the principle of low temperature carbonisation, present problems of extreme complexity, and though we are still some way from a final solution there is no doubt that considerable progress has been made. In reviewing this progress one recalls with gratitude the large contribution which was made to it by Dr. Lander's predecessor, Sir George Beilby, who contributes a foreword to the book, and who reminds us that the physical, chemical, mechanical, and economic aspects of the subject are so closely interwoven that only after an intimate study of all such aspects ought any serious estimate of its development as a national industry to be attempted. Apart from Sir George himself, it will be generally agreed that there is only one other authority who, by reason of the unique experience he possesses, is qualified to deal faithfully with the subject in all its ramifications, and that is Sir George's former assistant and successor.

"Chemicals"

SIMULTANEOUSLY with the opening of the British Empire Exhibition appears volume VII in the "Resources of the Empire Series," dealing with *Chemicals* (Ernest Benn, Ltd., pp. 207, 21s.). As Sir Max Muspratt points out in his introductory review, this "admirable volume" provides the reader with a great store of statistics and other valuable information relating to the chemical industry of this country, and both manufacturers and merchants will find it to be a fuller survey of the subject than anything hitherto available. The authors, Messrs. Ashe and Boorman, cover the chief branches of the chemical industry not only in the United Kingdom but also in Asia, Africa, America, and Australasia, and within comparatively narrow confines have succeeded in compressing a vast sum of practical information. On this material are based a series of conclusions of which more may be said in a further notice. In addition to the introductory review by Sir Max Muspratt, there is a contribution from Mr. R. G. Perry dealing with sulphur, while the general notes written for the series by the Prince of Wales and Sir Eric Geddes are also included.

Points from Our News Pages

Some impressions are given of the opening of the British Empire Exhibition, and a description is published of some of the exhibits in the Chemical Section (p. 428).

The plan of the exhibits in the Chemical Section is re-published (p. 430–1).

An article appears dealing with the prospects of developing the National oil supply from shale and coal (p. 438).

A letter appears from Mr. G. C. Hurrell on the use of disintegrating mills (p. 440).

According to our London Market Report, there is practically no change in values, but export business seems a little brighter (p. 448).

Owing to the Easter Holiday there has been little change in conditions in the Scottish chemical market (p. 451).

Books Received

CHEMICAL ENCYCLOPÆDIA. By C. T. Kingzett. London: Bailliere Tindall and Cox. Pp. 606. 30s.

THE MODERN THEORY AND PRACTICE OF PUMPING. By Norman Swindin. London: Ernest Benn, Ltd. Pp. 364. 42s.

REPORTS OF THE PROGRESS OF APPLIED CHEMISTRY. Vol. VIII., 1923. London: The Society of Chemical Industry. Pp. 600.

LOW TEMPERATURE CARBONISATION. By C. H. Lander and R. F. McKay. London: Ernest Benn, Ltd. Pp. 278. 35s.

CHEMICALS: The Resources of the Empire Series. By A. W. Ashe and H. G. T. Boorman. London: Ernest Benn, Ltd. Pp. 208. 21s.

COLOUR INDEX. Edited by Dr. F. M. Rowe. Bradford, Yorkshire: The Society of Dyers and Colourists. Pp. 371. Cloth, £5 15s.; leather, £6 10s.

NOTES ON CHEMICAL ANALYSIS. By Archibald Craig. Easton, Pa.; The Chemical Publishing Co. London: Williams and Norgate. Pp. 162. $2.50.

The Calendar

Apl. 28–May 9	British Industries Fair	White City, London.
2	Chemical Engineering Group: Annual General Meeting. 6.30 p.m.	Watt Room of the Engineers' Club, 39 Coventry Street,, London
2	Institute of Metals (Swansea Section) Annual General Meeting. 7.15 p.m.	University College, Singleton Park, Swansea.
2	Society of Chemical Industry (Manchester Section): "Insulin." Arnold Renshaw. "A Recent Bleaching Agent for Flour and the Detection of Persulphate in Flour." J. Miller.	16, St. Mary's Parsonage, Manchester.
5	Society of Chemical Industry (London Section): Ordinary Meeting. 8 p.m.	Burlington House, Piccadilly, London.
6	Northern Polytechnic Chemical Association: "The Organisation of Research in a Chemical Works." Dr. H. A. D. Jowett. 8 p.m.	Holloway, London, N.
12 to 23	British Industries Fair	Castle Bromwich, Birmingham

Chemistry at the British Empire Exhibition

The Opening Day: Some Notes and Impressions

"THE most perfect pageant, I think, I have ever seen," was Dr. Levinstein's comment on the opening ceremony by the King, as he returned from the Stadium with Mrs. Levinstein to the Chemical Section. And so said everyone who had been privileged to be present on Wednesday at that truly historic gathering. But the splendour of the Imperial function had not weakened Dr. Levinstein's interest in that corner of the Exhibition on which for months past he and a large number of colleagues have been working so hard, namely, the Scientific Section. "It is not quite complete," he said, "but already I think you will agree it looks very well considering the unfinished condition in which the whole Exhibition has been opened. There has been a great deal of hard work put into it, and I believe the result will well repay the labour involved." Another sentiment with which all will agree.

In some ways it seemed a pity that the Exhibition should have been opened at so incomplete a stage. For the truth is that nothing approaching perfection can be reached under three or four more weeks. Wembley, however, even at present is decidedly impressive, and the great crowds present on the opening day sufficiently testified to the public interest the Exhibition has excited. Though the Chemical Section was far from complete on the opening day, it was probably nearer that stage than any other, and the impression was strengthened that when finished it will look one of the brightest and best arranged sections in the whole Exhibition. The exterior colour schemes are striking without being extravagant, and the treatment of the stands is on the whole good, though here and there one heard complaints of the authorities insisting too strongly on what were described as "jazz" effects, not particularly suited to chemical exhibits. Several stands were still in course of construction on Wednesday, many others were awaiting the finishing touches; only a small percentage were fully prepared to receive their guests. The work here, however, should soon be completed, and when that final stage is reached the effect should be very satisfying indeed.

Meanwhile one can say with full confidence that, in view of the immense difficulties arising from strikes and the incidence of the Easter holiday, the organisers are to be congratulated on the very presentable state to which the Chemical Section had been brought. With the possible exception of the motor exhibits, where practically no structural work was required, the chemistry exhibits were probably nearest completion of any in the British home section. The whole effect is distinctly pleasing, being the result of a uniform plan, and enhanced by the decorative frieze, the white and bright coloured paint on the various stands, and the gardens with bright flowers and artificial grass bordering the main avenues in some instances. As has already been pointed out, the position is excellent, being the first portion of the Palace of Industry which the visitor reaches from the Wembley Park Station entrance. In addition, there is the fact that the area occupied is as large as or larger than the sections taken by the woollen trade and the cotton trade exhibits, and is thus clearly an unprecedented display of the British chemical industry.

On the day prior to the opening of the Exhibition one or two of the completed stands stood out distinct from the rest, mainly, perhaps, because they were not shrouded in sacking. Burroughs, Wellcome and Co. have a fine stand (No. 45) surmounted by a statue of Mercury, and hanging from the roof a number of glass "fruit" filled with coloured products. A minute box about a quarter of an inch long is an exact replica of the one in the Queen's Dolls' House, and contains 80 doses of medicine. The same firm, on another stand (No. 74), have a display of growing plants from which drugs are extracted. The Brunner-Mond stand is also very effective, with a domed central erection and surrounding offices of the associated companies. This is one of the stands having an artificial garden abutting on the main avenue. Peter Spence, with their display of crystals of various alums, many of which have taken years to grow, have a very effective exhibit. Bryant and May have a stand in the design of an old English timbered cottage, which is one of the features of the section; while more than one of the pharmaceutical firms have stands resembling the old-fashioned apothecary's shop, with bow-windows fitted with small square panes. The stands of Yardley, Erasmic and Eugene Rimmel, bordering the main avenue, are particularly attractive in their displays of pharmaceutical specialities. W. M. Gossage and Co, who have the corner stand, have arranged a display of a model British navy on a model ocean, which is proclaimed to be like their soap, "the best that ever entered water."

The entrances to the Palace of Industry have now been named in accordance with the general scheme and the recommendations of Mr. Rudyard Kipling. Thus the gate described in our plan last week, and reproduced again this week, as the North Gate, has now a name of textile significance, "Weft Gate," emblazoned over it. This gate incidentally is the one most easily reached from the Wembley Park Station on the Metropolitan Railway, being under cover all the way, a consideration in our uncertain climate. The great central entrance, described on the plan as the N.E. Gate, has now become the Gate of Harmony, while the small entrance from the colonnade further to the north has been named the Alchemists' Gate. This is an excellent name and, incidentally we understand, was suggested by a lady who is now much better known to the chemical exhibitors than Mr. Kipling has ever been. It is a tactful name; there can be no question of favouritism about it, no raising of controversial matters such as "What is a chemist?" and no risk of chemico-pharmaceutical confusion.

The Scientific Section arranged by the Association of British Chemical Manufacturers has been described as a sporting thing to do. It has meant a great deal of additional work for the organisers, but taken in connection with the commercial exhibits outside it should be really a most valuable adjunct in demonstrating the fundamental soundness of the British chemical industry. The exhibits are somewhat mixed; some will be readily understandable by the general public, but others will be more appreciated by the technical visitor from home or abroad, who will find a convincing display capable of overcoming very strong anti-English prejudices in the chemical line. Among the features likely to attract the ordinary visitors are the models of crystal structure shown by Sir William Bragg, and the historical exhibits including some of the original drawings by Dalton, the Father of Chemistry, showing his ideas of the structure of atoms. There is a really unique collection of historical portraits dating back to the dim ages of the science.

"C.A." Snapshots of a Personally-Conducted Tour by Mr. W. J. U. Woolcock

The central attraction, literally, is the fiery fountain, where there is something pyrotechnically novel and unique. The effect of various fertilisers is demonstrated by Dr. Page, of Rothamsted, in an exhibit consisting largely of specimens of growing plants with and without various chemical fertilisers. This is a feature which is sure to prove attractive to the ordinary visitor, while another thing which should not be missed is the display of crystals which has been arranged in connection with Sir Henry Miers' exhibit by Mr. T. W. Barker, a lecturer in crystallography at Oxford. In this, with the co-operation of manufacturers, there are extraordinarily fine examples of crystals of various kinds, and in addition there is a series of specimens to illustrate the historical work which has been done on the nature of crystals from the simplest measurements of angles up to the X-ray work of W. L Bragg. This series is described with the aid of printed cards in language which everyone can understand. There is, in addition, a hint of work which requires to be done in future in connection with crystals, more particularly in their function as wireless detectors.

Description of Chemical Exhibits

The British Drug Houses, Ltd.

THE exhibit of the British Drug Houses, Ltd., is divided into four sections dealing with Medicinal Chemicals, Laboratory Chemicals, Pharmaceutical Products, and Proprietary, Pharmaceutical and Toilet Specialities.

Among the pure medicinal chemicals are exhibited many pure compounds for use in medicine, including complex organic compounds prepared by synthetic methods and also active principles of natural origin derived from both plant and animal sources, as well as pure inorganic chemicals. The exhibit of pure medicinal glucose in this section is of particular interest.

Another very interesting feature in the work of the B.D.H. is the development of a department for the manufacture of biological products. Prominent in this department stands the manufacture of insulin, the active principle of the pancreas, which has already achieved such truly wonderful results in the treatment of diabetes. The manufacture of insulin was undertaken by The British Drug Houses, Ltd., in association for this purpose with Messrs. Allen and Hanburys, Ltd., of Bethnal Green, London, in the beginning of 1923 under licence granted to the two firms jointly by the Medical Research Council. Working at high pressure, work being continuous day and night and throughout week-ends, the staff of highly-skilled workers specially trained for this purpose, ably backed by the firm's staff of skilled engineers, quickly overcame the exceedingly great technical difficulties incidental to the manufacture of this fugitive substance; and in an incredibly short space of time, namely, less than three months, the B.D.H. achieved the production of insulin on the large industrial scale and succeeded in placing insulin on the market.

Before the war we had been dependent upon Germany for supplies of laboratory chemicals. Finding supplies cut off at the beginning of the war, a committee was appointed jointly by the Institute of Chemistry and the Society of Public Analysts which drew up standard specifications of purity for analytical reagents. The B.D.H. stepped into the breach and undertook the manufacture of these and other laboratory chemicals. A special department for their production was opened up, and development has since been prosecuted assiduously and continuously. The enterprise of this firm has now resulted in their list of chemicals numbering upwards of 3,500. In this section are also shown a range of standard stains and dyes, a supply of which is essential for microscopic work. In the same section is the B.D.H. Universal Indicator, a most useful reagent for determining quickly the approximate P_H of a fluid. The Universal Indicator is a mixture of several indicators, and shows the whole range of spectrum colours from red to violet in the correct order.

In the section dealing with Pharmaceutical Preparations will be found representative products illustrative of the many classes of these products, known in pharmacy as "galenicals" which are manufactured in the B.D.H. laboratories. These include solid and liquid extracts, tinctures, medicinal liquors and essences, syrups, emulsions, confections, granular effervescent preparations, ointments, pills and compressed tablets, lozenges, gelatine capsules, ampoules and sempules. The number of proprietaries manufactured by the company is large and only the chief lines are being exhibited.

All the products packed are actually manufactured by the company and only material of B.D.H. quality—*i.e.*, the best—is employed. Special mention must be made of Eastern Foam. The name of this vanishing cream is a household word in this country, where its sales are probably larger than those of any other preparations of the kind, and are rapidly being extended in overseas markets.

This firm is issuing a description of its exhibit in pamphlet form for distribution to visitors.

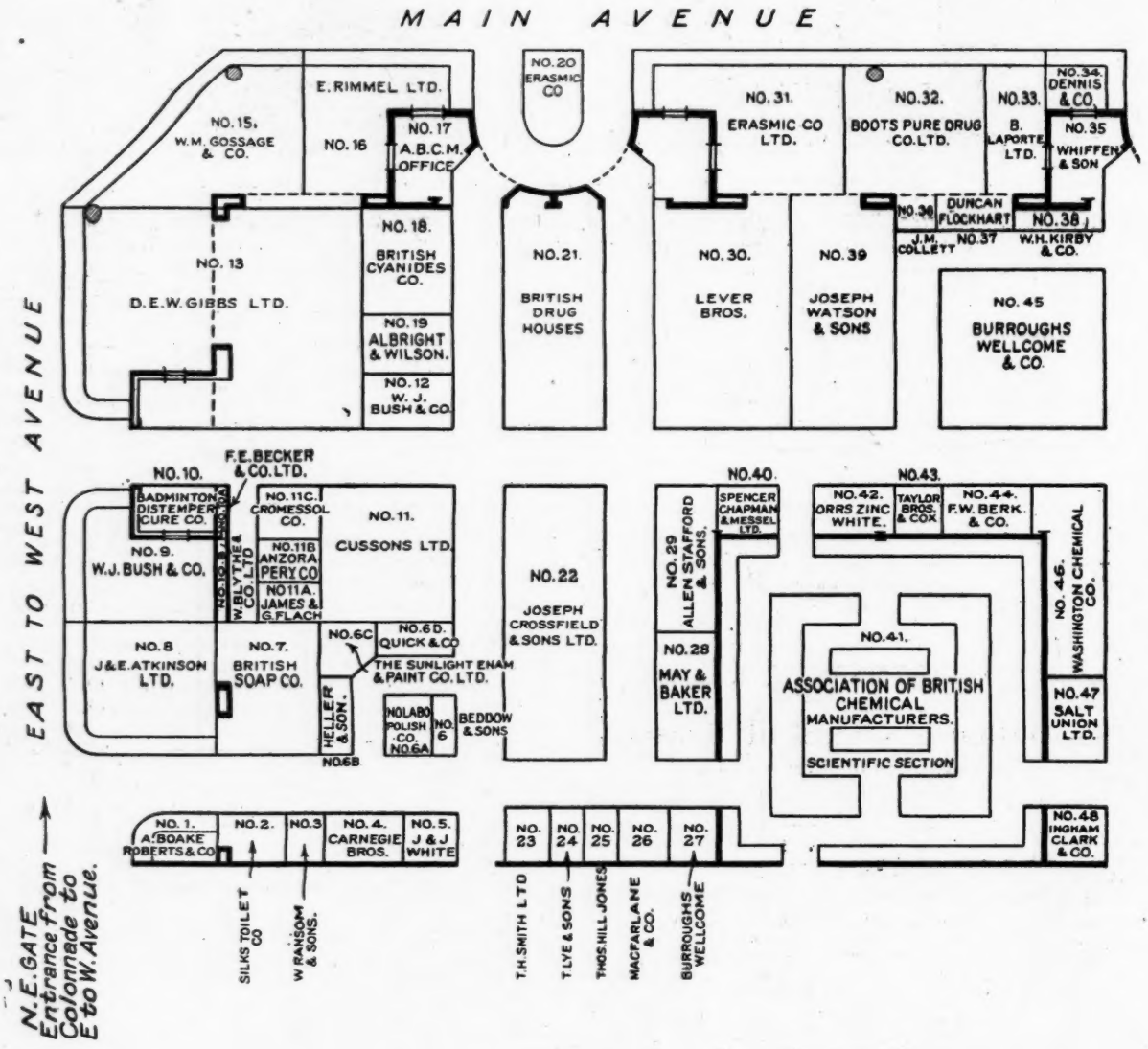
Boots Pure Drug Co., Ltd.

The display by Boots Pure Drug Co., Ltd., is confined almost solely to fine chemicals. These are arranged in the following groups: alkaloids, anæsthetics, antipyretics, antiseptics, glycerophosphates, hypnotics, perfume bases, research chemicals.

As the largest makers of British saccharin the firm make a special feature of this important chemical, and a chart showing the steps by which it is derived from coal tar is shown. Other charts outline the manufacture of acriflavine, aspirin, atropine and samples of all intermediate products are being shown. A specially interesting feature is a display of selected tablet preparations showing the distinctive forms of solution tablets (or solvellac) and tablets for internal use. The advantages of tablet preparations from the point of view of convenience and accuracy in the preparation of solutions of definite strength for medicinal purposes are now well known and need not be emphasised. Special displays are made of insulin of the firm's own manufacture, and stabilarsan,

(*Continued on page* 432)

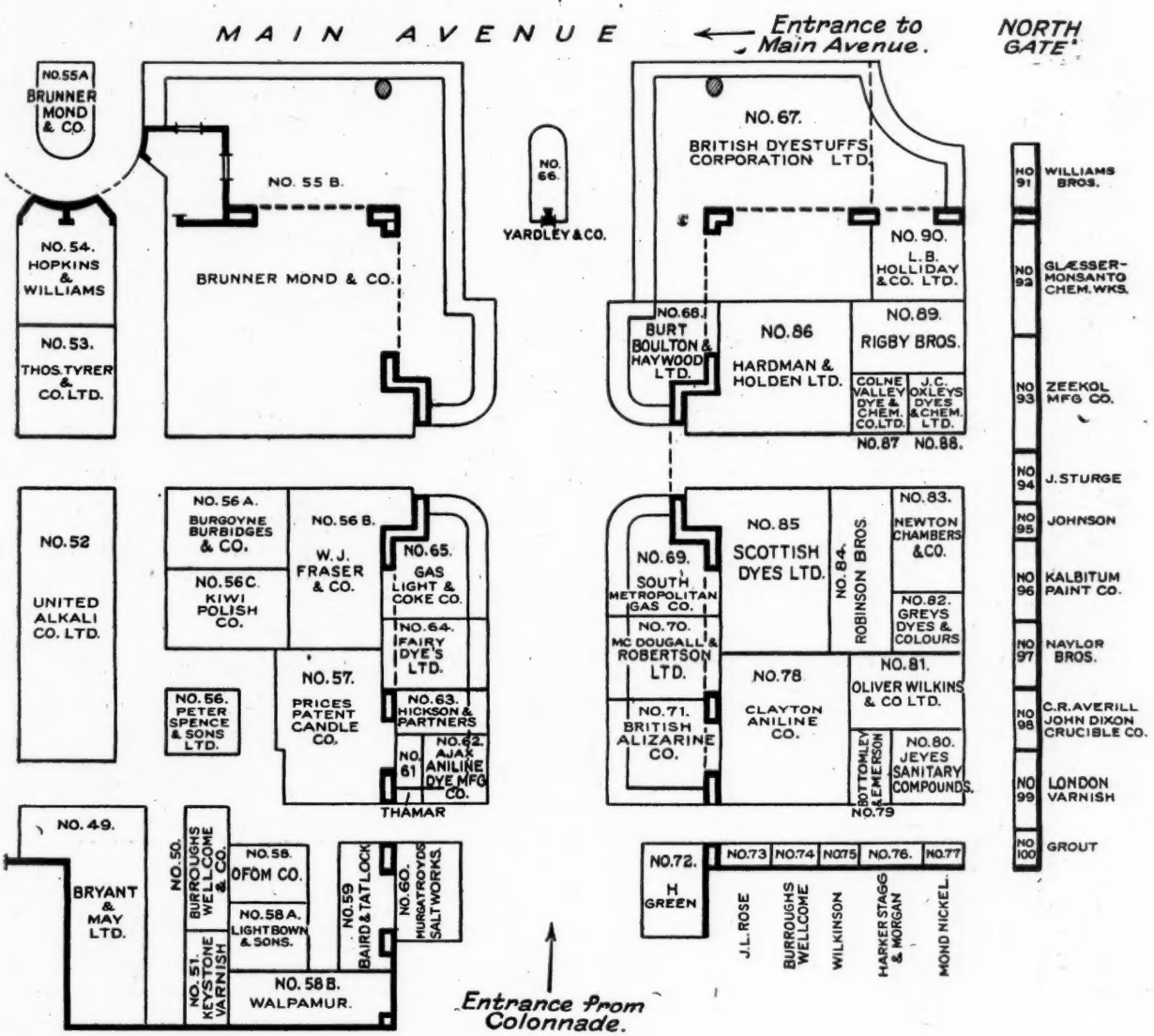
Ground Plan of Chemical Section—



Notes on Chemical Section Plan

In response to numerous requests we reproduce again the ground plan of the Chemical Section at the British Empire Exhibition, showing the exact position of the stands of the various exhibiting firms. The North Entrance, now named the Weft Gate, which is reached most easily from the Wembley Park Station side, leads direct into the main avenue. On the left of this avenue is the Chemical Section, which extends as far as the East-to-West Avenue and thus occupies one large corner of the Palace of Industry. The Section may also be entered from entrances from the Colonnade, one, known as the Alchemist's Gate, leading directly into the exhibits, and the other, the Gate of Harmony, to the East-to-West

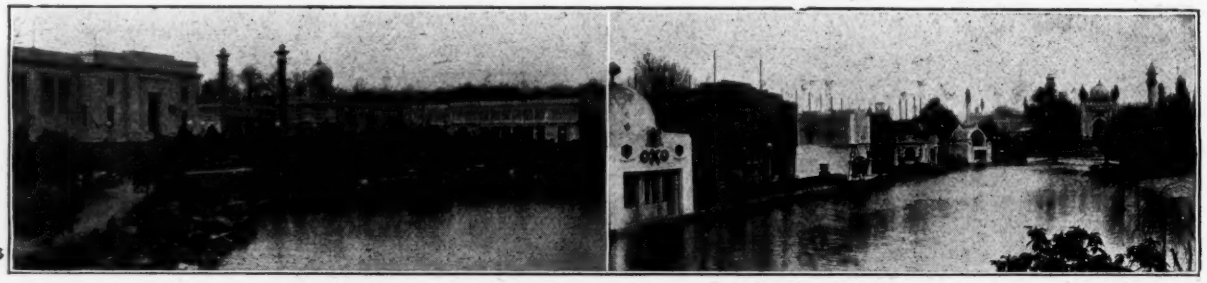
—at the British Empire Exhibition



Notes on Chemical Section Plan—*continued*

Avenue. The boundaries of the Chemical Section are thus provided by two main avenues crossing each other at right angles.

The situation of the Chemical Section has been admirably chosen. It forms a distinctive unit in itself, self-contained and so arranged that all its parts are easily accessible. The distinctive effect is heightened by the mode of treatment and decorative scheme. The coloured frieze, running along the top of the stands, serves as a broad ribbon to bind the exhibits together into one body, and the general effect promises to be bright, unified, and thoroughly distinctive.



Views of the British Malayan and Indian Buildings from the Lake

(*Continued from page* 429)

their own patented improvement upon the old German salvarsan.

A complete model of their works in Nottingham and enlargements of photographs of various portions of their plants is also on view.

A souvenir booklet will be distributed to visitors at the firm's stand, and the following special literature will also be available for distribution: (1) A catalogue of research chemicals, over a thousand of which are now included in their list; (2) descriptive booklets dealing with: (*a*) chloramine antiseptics, (*b*) flavine antiseptics, (*c*) saccharin, (*d*) stabilarsan, (*e*) insulin.

Brunner, Mond and Co., Ltd.

No exhibition embracing the Chemical Industry could be regarded as complete unless Brunner, Mond and Co. were included, and a striking stand carried out with a decoration scheme in bright yellow has been devised to house the company's exhibits and also those of its associates. A feature of the Brunner Mond display is a practical demonstration of the virtue of their special P.84 Silicate of Soda for hardening concrete. An abrasion machine is set up, on which blocks of cement are subjected to vigorous treatment. One half of the block has been allowed to absorb the silicate, and on this half the severe friction applied by the machine has little or no effect, whilst the other half, which has not been treated with silicate, wears away rapidly under exactly similar conditions. A series of solutions of silicate of soda with distinct properties is on view. Thus two of the grades are both 100° Tw, but one is a watery liquid whilst the other is a thick viscous fluid.

All the products manufactured by the company, soda ash, bicarbonate of soda, soda crystals, caustic soda, silicate of soda, calcium chloride, ammonium chloride, "Crex," crescent laundry soda, carbonate of ammonia, etc., are shown. A new form of calcium chloride is seen for the first time. It is a pure white crystal, containing 70–75 per cent. of real $CaCl_2$ and is an exceedingly pure form of the product, conforming to the B.P. standard with regard to arsenic content.

Castner-Kellner Alkali Co., Ltd.

The Castner-Kellner Alkali Co., Ltd., famed for their electrolytic caustic soda, have also an interesting display of their products at the same stand. They are the foremost example of the successful exploitation of the manufacture of sodium and chlorine products by the electrolytic process.

The principal products of the company are bleaching powder, caustic soda, hypochlorite of soda, liquid chlorine, sodium peroxide, perborate of soda, hydrochloric acid, chloracetic acid, sulphur chloride, sodium (metallic), chlorine derivatives of ethylene and ethane (including trichlorethylene and tetrachlorethane and kindred products), and solvent soaps. Visitors interested in the manufacture of soap, paper, dyes, chemicals, paints, varnishes, rubber, and in the textile industries, oil extraction, sanitation, chlorination of water, laundry works, horticulture, etc., should certainly pay a visit to this stand.

The Electro Bleach and By-Products, Ltd.

This firm, whose works are at Middlewich, Cheshire, and whose exhibit is also housed on the Brunner Mond stand, is another instance of the successful operation of the electrolytic process. Their first commercial installation of the Hargreaves-Bird Cell was erected at Middlewich in 1900, and although many improvements have been introduced in recent years the basic process, which is being worked with great success by this company, remains essentially the same.

Chlorine gas and sodium carbonate solution are prepared directly by electrolysing the brine pumped from the Cheshire brine-field and introducing steam and carbon dioxide. The chlorine is brought into contact with specially prepared slaked lime which absorbs it to form bleaching powder, or chloride of lime. Soda crystals (washing soda) are made by concentrating and crystallising the sodium carbonate solution, and caustic soda is produced by treating the same solution with lime. The resultant carbonate of lime in a very fine state of division is thoroughly dried in a special rotary dryer, for use in agriculture and for the stone-dusting of mines. By further carbonating the soda liquor, sesquicarbonate of soda is produced in the form of fine needle-like crystals, and is in great demand for the preparation of bath salts and for use in the laundry. The interesting literature to be obtained at this stand will well repay a visit.

Chance and Hunt, Ltd.

The firm of Chance and Hunt, with works at Oldbury, Wednesbury, Stafford and Birmingham, manufacturing high grade chemicals for a wide variety of trades, are also well represented. Their "Fortress" brand has become a recognised guarantee of excellence.

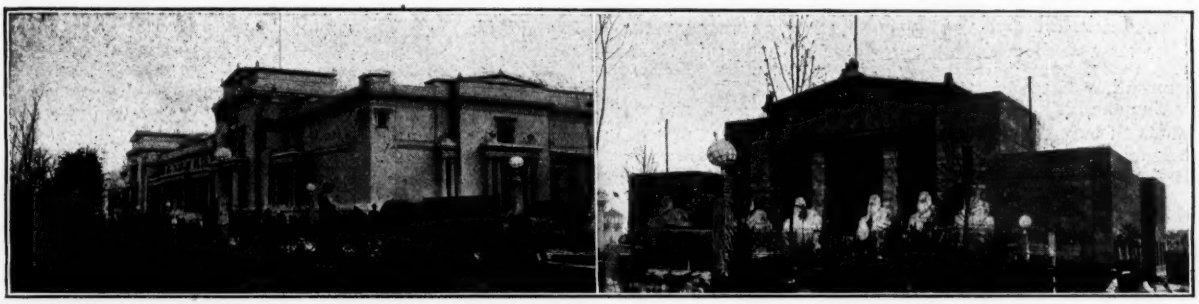
Special attention is directed to their ammonium carbonate for the biscuit, bakery and other trades; caustic soda for the textile and soap industries; sulphuric acid for sulphate of ammonia, the fertiliser and metal industries; hydrochloric acid and muriate of ammonia for the galvanising trades; liquid ammonia for laundry, pharmaceutical and domestic purposes; sodium sulphide for the dye and tanning industries; and a specially pure white sodium sulphide for photographic purposes. For the glass and paper trades a high quality saltcake is manufactured, which is in constant demand by users the world over. Oxide of iron pigments are manufactured and are finding increasing favour in the paint and colour trades.

Chance and Hunt, we understand, possess brine of excellent quality at Stafford, and in very modern plant produce salt of every description. A non-caking "free running" quality, of full flavour, admirably suited for use in salt cellars and salt pourers is of particular interest.

The company state that they are prepared to investigate any problems connected with the use of their products, and from time to time to bring to the notice of their friends any special plant, the utility of which they have themselves proved out in their own works. Their Calder-Fox scrubber is successfully dealing in many works with the difficult problem of removing the acid mist contained in the exit gases from sulphuric acid concentration plants. Firms having difficulty in this respect are invited to apply to the company for full details and royalty terms.

Buxton Lime

The Buxton Lime Firms Co., Ltd., who own extensive quarries in Derbyshire, have an interesting display of their products on the Brunner Mond stand. For centuries Buxton has been the centre of the lime burning and limestone industry in the United Kingdom, and to-day the output of the company well exceeds a million tons per annum. "Old Buxton Lime"



The Canadian Building and the British Government Pavilion

possesses characteristics which render it the most suitable for agricultural and industrial purposes.

Of peculiar interest is a form of mechanically slaked lime, sold under the name of " Limbux." This superfine grade of hydrated lime is produced by a special process, and on account of its unvarying purity and remarkable degree of fineness, is specially suitable for water softening, concrete construction, chemical processes, and all purposes for which the highest grade of lime must be used. Lime in its various forms has a very wide appeal, and much interesting information is to be obtained at the Buxton Lime Firms' stand.

Synthetic Ammonia and Nitrates, Ltd.

Much interest will be shown in the exhibit of the Synthetic Ammonia and Nitrates, Ltd., who have recently completed the erection of extensive works at Billingham, Stockton-on-Tees, for the fixation of atmospheric nitrogen, and when the plant is fully working the company will occupy an important place in the fertiliser industry. The company was formed to take over from H.M. Government the works in course of erection for the production of nitrates for high explosives, and whilst the plant will be capable of producing large quantities of nitrogenous fertilisers in times of peace, it ensures that, should occasion demand, a ready supply of huge quantities of nitrates will be available without reliance upon foreign supplies. Samples of anhydrous ammonia, ammonia liquor, and sulphate of ammonia produced by the company are included in their exhibit.

Burt, Boulton and Haywood, Ltd.

The exhibit of Burt, Boulton and Haywood, Ltd., largely consists of the products manufactured in all the English tar works of the firm. Together with the samples of various wood preservatives are shown specimens of timber which have been creosoted and exposed to the atmosphere for over 70 years, demonstrating the efficacy of creosote as a wood preserver. Over 60 years' experience in the treatment and preservation of timber has shown that there is no process so satisfactory as this of creosoting.

All types of disinfectants are exhibited, and certain quite new horticultural products are also shown. A new product of exceptional interest is that of colloidal sulphur now manufactured at the company's works at Silvertown. This sulphur is prepared in an extraordinary fine state of sub-division, and its uses in the horticultural and veterinary world are increasing rapidly. Toilet soaps containing this colloidal sulphur are also exhibited. Quite as a side item to the company's business, the Premier Mill is being demonstrated, together with a number of products prepared by this machine, including paints, enamels, emulsions, finely ground pigments, etc.

Duncan, Flockhart & Co.

The firm's exhibits are classified under three headings: anæsthetics, organo therapy, and vaccines and protein therapy. Under anæsthetics they are showing various grades of chloroform and ether, and also ethyl chloride, which is now so widely used in all minor operations, particularly for children and also as a local anæsthetic.

Erasmic Co., Ltd.

The Erasmic Co., Ltd., are making a most distinctive exhibit. Their products, which are household words throughout the whole world—" Peerless " Erasmic Soap and Erasmic Shaving Sticks—naturally occupy a prominent space, but the more recent productions make a most pleasing display.

Gas Light and Coke Company

The Gas Light and Coke Company bears its 111 years of history lightly, and exhibits not only its well-known range of tar, ammonia and cyanogen products, but emphasises its new developments, Beta naphthol particularly, in a setting of derived intermediates. Some of the samples point to higher standards of purity—naphthalene of 79·3–79·5°; cresol, B.P., and pale liquid carbolic acid of 99/100 per cent. New shades of blue are also shown.

A working model demonstrates the ease with which the company's neutral sulphate of ammonia can be applied to the soil.

Hickson and Partners, Ltd.

The exhibit of Hickson and Partners, Ltd., contains as its chief feature a large pigeon-holed showcase showing samples of intermediates and dyes. This case is so arranged as to illustrate the various stages in manufacture from the very simplest raw materials, crude benzol, sulphur, and nitrate of soda, up to the finished dyes in the logical chemical sequence.

The firm's policy has been built up to follow logical chemical lines, as thus all stages are carried out at Castleford, saving all carriage and package from works to works at the various half-way stages. They only make a few colours, but are tackling these on a large scale. Sulphur blacks, and of this group Vidal's latest type, Vidal Victory Black, are the first stage from dinitrochlorbenzene. The new Vidal Victory Blacks are gradually establishing their supremacy over the common type sulphur black, and are infinitely superior to the German pre-war types.

The product in which the firm claim to be pre-eminent in this country is Roseine (Magenta). Their policy of handing on all saving in cost to the consumer and aiming at large output on a small margin of profit, they state, has gradually built up a connection which is to-day literally overwhelming them with orders in this department, in spite of recent additions to the plant. To their satisfaction these orders are not merely for the home trade, but to-day they have some substantial contracts for delivery to the East, proving that they can compete well with Germany and America in the open world's market. They have adopted the original British name of Brook Simpson and Spiller, Roseine, for this product, believing in British names for British products. The name Magenta is only one of considerably later use in this country.

As well as the stand mentioned above they have cases showing patterns dyed on all classes of materials, with black, roseine, cerise, soluble blue and other colours. The curtains round the showcase are dyed with Vidal Victory Black, roseine and soluble blue. These colours give a pleasing colour effect, and present a striking contrast.

L. B. Holliday and Co., Ltd.

In formulating plans for their exhibit at the forthcoming British Empire Exhibition, L. B. Holliday and Co., Ltd., have departed considerably from the usual plan of dyestuff manufacturers of illustrating the use of their dyestuffs in colouring the thousand and one things of ornament or utility which fill our modern life. The enormous number of different dyestuffs which a well developed and fully equipped firm manufactures and the great variety of applications of those dyestuffs is bound to be bewildering rather than instructive to the lay mind. The firm have, therefore, concentrated on one idea, and, denying themselves the satisfaction of showing all

the beautiful things in silks and leather and printed and woven fabrics of all kinds which can be produced with their dyestuffs, they restrict themselves to providing an ocular demonstration that British-made dyestuffs are identical in fastness to exposure with the best foreign dyestuffs.

The exhibit consists in the main of an octagonal showcase in which the eight sections are occupied by the seven prismatic colours, together with black; and in each section are draped patterns of upholstery plush dyed with suitable fast to light colours, as manufactured in the Holliday works at Huddersfield; together with these dyeings are comparative exposure cards which have been independently and impartially prepared by the Huddersfield Chamber of Commerce, showing the comparative fastness of a dyeing of the Holliday dyestuff, under the same conditions of exposure as an authentic German or Swiss dyestuff of the same nature; in no single case is the comparison to the disadvantage of the British product.

Jeyes' Sanitary Compounds Co., Ltd.

The pre-eminence of coal tar disinfectants is due to great stability, high germicidal strength, and relative non-toxity. Germicidal strength is not only dependent on chemical properties, but is a function of certain physical properties—viz., the power of forming a perfect and stable emulsion with water. There are two distinct classes of coal-tar fluids—black and white. The oldest and best known of these are the former, which are typified by Jeyes' Fluid and Cyllin. On pouring into water they yield milky-white emulsions, produced by the scattering of light from the surfaces of an enormous number of ultra-microscopic particles.

The white fluids, as exemplified by Jeyes' White Cyllin, are produced by the mechanical emulsification of certain phenolic constituents of the higher coal-tar fractions in the presence of traces of stabiliser. This process is in operation by the model on the stand, and the fluids thus produced have a potency equal to that of the black fluids. Black fluids are stable over a wide range of temperature, whereas the white fluids, while possessing the property of miscibility with salt and brackish water, are demulsified at the freezing point of water. The standardisation of disinfectants is effected by the now almost universally adopted Rideal-Walker test. The apparatus used in connection therewith is demonstrated on the stand.

In addition several medical and domestic sanitary preparations are shown, including a novel vaporiser, employing a pleasant smelling compound of high Rideal-Walker efficiency. Cultures on Agar from town air and other sources of infection are also shown.

B. Laporte, Ltd.

B. Laporte, Ltd., have arranged a comprehensive display of their products, including:—Hydrogen peroxide of all strengths from 10 volumes to 120 volumes, and of various commercial qualities for the bleaching of wool, silk, straw plait, gelatine, etc.; also a highly refined and stable quality for medicinal and toilet use. Barium peroxide 85 per cent. to 90 per cent.—this is the purest and highest strength made, and the only British make. Barium carbonate for the prevention of "scum" in bricks, terra cotta and other ceramics; for purifying water and for the removal of sulphate of lime from sugar solutions and other liquids; for glass manufacture and various other technical processes. Barium sulphide 75 per cent. to 80 per cent., for use as a depilatory and for the dearsenification and purification of acids. Barium sulphate precipitated, known in trade as "blanc fixe," and, in the form of pulp, used in the glazing of paper; employed also as a dry powder in the production of enamel paints, pigments and printing inks.

Other products shown are formic acid, barium hydrate, barium monoxide 90 per cent. to 95 per cent., sodium hypochlorite, sodium pyrophosphate, sodium acid pyrophosphate, sodium sulphide, sodium bisulphite, sodium perborate, and laundry requisites, including dry soaps, soft soaps, washing powders, preparations for whitening and removing stains, blues, etc.

May & Baker, Limited

May and Baker's exhibit covers a wide range of chemicals both for medicinal and industrial purposes. It includes products as far apart as seidlitz powder, the old-fashioned household remedy, and novarsenobillon, one of the most efficient products of modern scientific research. As these examples indicate, the activities of this firm have kept pace with current requirements. Medical practice now demands precise and scientific weapons for combating disease. The firm have played a considerable part in satisfying this demand, and manufacture, on a large scale, various modern remedies. These include antisyphilitic preparations, hypnotics, local anæsthetics, and diuretics.

Chemicals for general medical and industrial purposes are represented by a wide selection of organic and inorganic compounds, alkaloids, resins, chloroform, ether, etc.

The Midland Tar Distillers, Ltd.

This exhibit, by the Midland Tar Distillers, Ltd., in co-operation with the South-Western Tar Distilleries and Messrs. Burt, Boulton and Haywood, Ltd., consists of samples of primary and intermediate products obtained by the distillation of coal tar. The exhibit illustrates the wide ramifications of the industry even in its earlier stages, the many compounds produced for the treatment of roads being particularly noticeable. Specimen sections of roads, after many years' use, originally treated with the compounds exhibited, are shown. Samples of horticultural specialities, disinfectants, tanning materials, medicinal compounds, etc., are also included, and models of two types of plant for the continuous distillation of coal tar are exhibited by the Midland Tar Distillers, Ltd. (Major's Patent) and Messrs. Burt, Boulton and Haywood, Ltd., respectively, together with a model creosoting plant by the latter firm.

An exhibit by Synthite, Ltd., at this stand illustrates a further stage in the coal tar industry. The various useful and ornamental articles exhibited are manufactured from "Synthite" (a condensation product of phenol). The uses to which this material can be put are practically unlimited. This firm is the largest British manufacturer of "formaldehyde," and samples of these products are shown.

Newton Chambers & Co.

Newton Chambers and Co.'s stand represents "Izal" germicide, which is "used the world around," and throughout the exhibition. This stand is an original conception. In the centre of the exhibit there rises a central pylon supporting a huge bottle containing "Izal." This bottle is supported upon an illuminated glass stand showing silhouettes of Newton Chambers and Co.'s collieries, chemical works, ironworks, etc. The pillar which supports these springs from those two commodities (coal and iron) which have contributed so greatly to the wealth of the Empire, thus at the same time symbolising the other interests of this old-established firm (founded in 1793). An illuminated representation of the world as a globe is found at each corner of the exhibit, and it would appear that "Izal" is overflowing from the bottle, running in streams to every quarter of the globe. In the showcase there is a representative array of other products manufactured by this company.

Peter Spence and Sons, Ltd.

Peter Spence, who have been well known all over the world as manufacturers of alum, etc., for nearly 80 years, show specimens of various qualities of alum, aluminium sulphate, and other inorganic salts of aluminium, and of their manifold applications in the mordanting and dyeing of textiles, papermaking, leather manufacture, fireproofing, drinking water purification, sewage precipitation, etc.

A beautiful feature of this exhibit, and one which should not be overlooked, particularly by anyone interested in crystallography, is a wonderful display of a comprehensive range of practically perfect crystals of various alums, all of them regular octahedral in shape, illustrating their isomorphism, and including one huge crystal weighing over 200 lb., which took nearly four years to grow and is probably the largest single artificial crystal of any substance ever produced. Flanking this exhibit are two large pyramidal columns, over 5 ft. in height, each of which is built up of over 130 practically perfect octahedral alum crystals of various sizes, the largest of which took nearly two years to grow.

Another section of the exhibit is mainly devoted to this firm's well-known titanium specialities, including those extremely powerful reducing and stripping agents, titanous chloride and titanous sulphate, and the titanium potassium

oxalate so largely used in leather dyeing, with examples of their industrial application.

The firm are also showing other materials of which they are large producers, such as sulphuric acid, carbonate of lime, and silica powder, etc.

Scottish Dyes, Limited

Scottish Dyes, Ltd., are exhibiting in bottles their well-known dyes of the Solway Blue B and Celatene series. In addition specimens of the intermediates such as anthranilic acid, anthraquinone, dichlor iso dibenzanthrone, methylamine hydrochloride, naphthanthraquinone and phthalic anhydride are being shown. Them in feature, however, of their stand will be the textiles dyed and printed with these colours. They specialise in vat colours of the anthraquinone series for cotton and silk dyeing, and acid alizarine colours for wool dyeing.

South Metropolitan Gas Co.

The stand has been designed and built by the company to display to advantage Metro chemical products obtained in the distillation of coal. The benzene ring, so much used in the formulas of coal tar chemistry, is applied in many ways to the structure of the exhibit for decorative purposes and is the means of assisting largely in the display. Most prominence is given to the well known Metro sulphate of ammonia, which is presented in bulk in terrace-garden-like surroundings. Parts of the balustrade woodwork used in the framing of the sulphate scheme have been treated with Metro creosote, which demonstrates the series of brown shades offered by the manufacturers. Metro disinfectant fluid, road tar to the specification of the Ministry of Transport, benzol and pitch, also occupy important positions on the stand.

Spencer Chapman and Messel, Ltd.

Although Spencer Chapman and Messel, Ltd., have only a comparatively small exhibit it is of considerable interest. Enclosed in an oval glass case mounted on a mahogany base there is a centre show bottle containing SO_3 crystals surrounded by exhibits of 20 per cent., 40 per cent., 60 per cent., 80 per cent. oleum and H_2SO_4. Framed charts, mounted on easels, are also exhibited, showing the curve and table of the melting points of sulphuric acid and oleum.

The United Alkali Co., Ltd.

The stand of the United Alkali Co. is carried out in inlaid mahogany, and a special feature is made of the uses of the firm's various products in some of the main industries in this country, such as calico printing, dye manufacture, textiles, paper making, and glass making. The central stand will show pictures of these various industries, and below each picture will be an assortment of samples of the products used in each industry. A diagram of intermediates will also be shown. The exhibit also contains two upright columns encircled by a series of panels rotating slowly. These panels contain illustrations of the uses of the firm's products in various industries, such as soap making, galvanising, tanning, agriculture, etc.

The Washington Chemical Co., Ltd.

" Pattinson's " Magnesia in its various forms is the main feature of the exhibit of the Washington Chemical Co., Ltd., the sole manufacturers, whose works are situated within eight miles of the city and port of Newcastle-on-Tyne. The company was founded in 1840 by the late Mr. Hugh Lee Pattinson, F.R.S., the patentee of the process, in conjunction with the late Mr. R. S. Newall, F.R.S., and since that time the works have steadily increased in size to meet the growing demand for the company's various products. It is to-day the largest magnesia producing plant in Europe, the works property extending over an area of fifty acres.

The following varieties manufactured by the company for industrial purposes are exhibited : light carbonate of magnesia in powder and in block ; light calcined magnesia in powder and special heavy calcined magnesia in powder. These forms are supplied to the following trades : motor tyres, pneumatic and solid, electric cable insulation, and the rubber industry in general, explosives, soap, printing ink, enamel-ware, fine table salt, scientific glass, china glaze, cigarette papers, toilet powders, and many others.

" Pattinson's " Magnesia has been known to the pharmaceutical trade throughout the world for the past eighty years, and is specially produced for this purpose to conform with the requirements of the British Pharmacopœia. It is usually manufactured for druggists in the following varieties : light carbonate of magnesia, ponderous carbonate of magnesia, light calcined magnesia, ponderous calcined magnesia, and fluid magnesia.

The powders and fluid are packed as above to suit the requirements of wholesale and retail druggists both at home and abroad.

J. and J. White, Ltd.

The firm of J. and J. White, Ltd., are the oldest and largest manufacturers of chrome salts in the world. Their exhibit is designed to show the beautiful colours of the various chrome compounds and to display some fine specimens of bichromate crystals. The contrast between the dull raw materials, namely common salt, muriate of potash, chrome ore, limestone and pyrites, and the brilliant finished products is very marked.

The chief manufactures consist of bichromate of potash and bichromate of soda, both of which are largely used in dyeing, tanning, colour-making, etc. The potash salt crystallises in beautiful orange-red crystals and is sold both in the crystalline and powder form. Bichromate of soda cannot be exposed to the air without absorbing moisture and therefore it is not possible to exhibit large crystals of this salt with the same freedom as in the case of the potash salt. The bichromate of soda is therefore shown only in the three forms in which it is put on the market—crystal, cake, and anhydrous. For some considerable time tanners have been using bichromates for tanning leather, having made from them chrome tanning liquors for this purpose. These liquors are often of very uncertain strength and the results obtained with them, therefore, vary. To avoid this the firm have produced a " Chrometan " liquor which can be crystallised and sold in the dry form. Both the liquor and the crystals have a basicity of 90, the liquor containing 12½ per cent. and the crystals 25 per cent. oxide of chromium.

Oxide of chromium (green) is also produced by the company, and a sample is shown on the stand. It tests over 99·5 per cent., has no carbon in it, and a limit of ·03 per cent. of sulphur.

Chromic acid, bichromate of ammonia, and sulphate of ammonia are also shown. The last named is produced as a by-product. Various other chrome compounds are shown, but some of them are not of much commercial value, such as trichromate of potash, trichromate of ammonia, chromate of strontium, sesquioxide of chromium and chromium fluoride. They are interesting, however, as they show a great variety of shades which belong to the chrome compounds.

Notes on Some Other Exhibits

Relay Automatic Telephone Co., Ltd.

The exhibit of " Relay " automatic telephones takes an unusually practical form, and consists of a complete installation. The erection of a 200-line private automatic telephone exchange commenced on December 1, 1923, and the exchange was completed two weeks later. This exchange provides the entire automatic internal telephone service for the Exhibition, and links up the administration, Indian Empire, Dominions, Colonies, and many large individual exhibitors. Connections in any part of the Exhibition are made in four seconds, and the exchange gives a continuous day and night service without the aid of any human operator. This exchange on Stand S. 778, Palace of Industry, Building Section, will be open to the inspection of all visitors, and will be one of the wonders of the Exhibition. In the Palace of Engineering, Avenue 14, Bays 11–12, there are exhibits consisting of " Relay " public, private, and private automatic branch exchanges. The public exchange is of the type supplied to the British Post Office, the Government of India, Givernment of South Africa, and the P.T.T., France, and is shown working with a small satellite exchange.

The " Relay " is the latest system of automatic telephony and is based on new principles. " Relay " exchanges employ no electro-mechanical switches, the exchange, as the name implies, being built up entirely with relays. All mechanical devices and moving parts (as generally understood) have been abolished, so that there are no parts to wear out, nor any need for cleaning or lubrication ; all the operations of number-

selection, connection, ringing and disconnection are performed by relays. Intricate as the system appears, the method of operation is exceedingly simple, and visitors by inspecting the "Relay" exhibits in the Engineering Section, will have an opportunity of grasping some of the wonders and simplicity of this system.

Nobel Industries, Ltd.

Nobel Industries, Ltd., have a large exhibit adjacent to the Chemical Section. The visitor will be attracted from the outside by the gold and aluminium paint—products of Nobel companies—which decorate the front, and inside by a massive model landscape designed to show the usefulness of Nobel products, their influence on commerce and reconstruction and their effect on everyday life. Thus, on this model will be seen mines, quarries, public works, railways, tunnels, shipping and so forth, for the working or construction of which explosives are fundamental necessities. 50,000 tons are used annually in winning coal and metal ores from the mines of the Empire.

A glance round the Nobel Bay—it is too large to be called a stand—will show every product carefully arranged on panels made by Nobel Industries' companies which contribute in a larger measure than is generally appreciated to the necessary commodities of life. Semi-manufactured goods of non-ferrous metals, such as brass and copper rods, wire, hollow brass and copper ware, brass fittings of all sorts, collodion products, leather cloth, gas mantles, etc., all illustrate this point. Visitors will also observe the relationship between the metal and explosives sections of Nobel Industries, Ltd., in sporting cartridges for rifles and shot-guns, in containers of greater calibre for explosives charges and in the apparently insignificant but most important detonator.

In addition to their exhibit in the Palace of Industry, the method of shot-firing in the Exhibition Coal Mine arranged by the Mining Association has been fixed in position by Nobel Industries' experts. Indeed, the influence of Nobel products will be seen by the thoughtful visitor in many places throughout the Exhibition, the most striking of which will be in the gilded pillars in the Palace of Industry, which, we are informed, have been decorated with a mixture of collodion and British made metal powders.

G. and J. Weir, Ltd.

Monel metal in all its varied forms and applications is being exhibited by G. and J. Weir, Ltd., Cathcart, Glasgow, at Stand No. 47, Avenue 6, Bay 17, in the Palace of Engineering.

Monel metal, it will be remembered, is a technically controlled nickel-copper alloy of high nickel content. It is produced from copper-nickel ore obtained from mines in Ontario, Canada, and is mined, smelted, refined, rolled, and marketed solely by the International Nickel Co. The name "Monel Metal" is a registered trade mark.

The ore as mined can be examined, and excellent photographs show the Canadian mines from which it is obtained. The exhibit includes a wide range of Monel products which have been in prolonged service under the most severe conditions, and illustrates admirably the outstanding qualities of Monel. This metal, due to its great strength at high temperatures and its resistance to corrosion and erosion, is being increasingly adopted in the larger power plants throughout the country. The exhibit includes castings, forgings, stampings, and parts made from rod, sheet, wire, etc., not the least interesting being the turbine blading. The samples shown illustrate the excellent finish which is now obtained on this product.

The Chemical Industry is catered for, and a centrifugal basket made entirely of Monel metal, as used in the sulphate of ammonia recovery plant of the larger gas works, is exhibited. Although this basket is made of metal considerably thinner than ordinary practice in copper, a life of three or four times that of the copper basket is claimed, on a basis of price for price.

L. Oertling, Ltd.

The firm of L. Oertling, Ltd., are exhibiting a number of balances of various types, including one with a six inch triangular beam of invar steel with the pointer of angle aluminium to decrease the effect of surrounding vibrations, and a special movement for steadying the pans when setting the balance in operation. The beam has been cut from a solid piece of invar steel containing 36 per cent. of nickel, having a co-efficient of expansion of ·00000087, left finished with a high polish; the instrument is also provided with a plane circular mirror with a right-angled prism for the purpose of reading the oscillation of the beam at a distance. The beam is also provided with a protection, and special arrangements have been made for the height of the pans. This is the latest balance for research work.

Assay and bullion balances are being shown, also an instrument for testing the amount of moisture in tobacco. In the great exhibition of 1851 the jury reported on this firm's exhibit to the effect that better balances had probably never been constructed, and awarded the Council Medal, this being the highest award granted at the exhibition. The progress of the firm will be found to have made great strides with the scientific knowledge gained in the interim.

The Eötvös gravity balance manufactured by L. Oertling, Ltd., is being shown in the Imperial Resources Bureau exhibit, This instrument is intended to assist the geologist in the location of subterranean mineral deposits, ores, etc., the object being to reduce the expense of test drilling by minimising the number of borings required. Full particulars of this instrument will be available for those interested.

British Arca Regulators, Ltd.

This company is showing in the Palace of Engineering, Stand 222, Avenue 1, a large range of automatic regulators for various purposes and conditions. The exhibit includes relays for the control of high and low pressures and vacuum, air temperature, humidity, temperature of liquids, etc.; also a hydraulic cylinder with pilot valve operating a steam regulating valve, and another cylinder operating a butterfly valve. A compact type of valve is also being operated. Any one of the relays can be caused to operate one or other of the cylinders or the Compact valve, thus enabling a practical demonstration to be given of almost any possible arrangement for automatic regulation. The complete arrangement of the Arca Regulator to control the temperature of de-superheated steam is shown. This consists of a thermo relay operating valves of the Compact type admitting water to a series of sprays fitted into a steampipe. A complete range of Compact valves is shown, and one or two different sizes of the cylinder-operated valves.

Glenboig Union Fire Clay Co., Ltd.

This firm is exhibiting a large quantity of special fireclay bricks, blocks, gas retorts, etc., all in the well-known Glenboig brand of which they are the sole proprietors and manufacturers, and which is acknowledged to be unequalled where high sustained heats and sudden changes of temperature are to be contended with, and is in great demand and supplied in large quantities both here and abroad to all the principal iron and steel, copper, roasting, chemical, gas and electric and all other furnaces where high temperatures are to be met with.

The Gas Industry Exhibit

The value of the exhibits in the Palace of Industry largely depends on the extent to which they represent not individual firms and undertakings but united and co-operating industries. In the very centre of the palace is one of those which happily falls, like the Chemical Section, into the latter class—the British Empire Gas Exhibit.

The Gas Industry here presents a triumph of that united effort which has long distinguished its activities. The chairman of the exhibit, Mr. David Milne Watson, M.A., LL.B., who is President of the National Gas Council, Governor of the Gas Light and Coke Co.—the largest gas undertaking in the world—and Chairman of the Federation of Gas Employers and of the Joint Industrial Council for the industry, has in these several capacities exercised for many years a leading influence not only in uniting the industry as a whole but in unobtrusively yet fruitfully building up behind the scenes the excellent relations which prevail between the employers and the 150,000 employed in the gas industry.

At Wembley Mr. Milne Watson, who by the way is among other things a Deputy Lieutenant of the County of London, presides over a unified exhibit to which nearly all of the 1,400 company and municipal gas undertakings of the kingdom and a number from overseas have subscribed, as well as the manufacturers of gas appliances and plant. The public will consequently have the uncommon advantage of seeing presented, not the particular patent of this or that enterprising manu-

facturer, but only the best and latest of everything, chosen by an executive committee which, under the chairmanship of Mr. F. W. Goodenough, has subordinated all trade rivalries to the aim of making the exhibit a representative harmonious whole.

In addition to the advantages arising from this unity, and from the interest of the exhibits themselves, the public will find a portion of the domestic section of the Gas Exhibit devoted to a rest lounge—a welcome rendezvous and resting place in the midst of a tiring Exhibition, as all great exhibitions tend to be. This thoughtful provision for the weary visitor speaks well of the foresight and experience of the Gas Industry in planning at once a worthy and a pleasing part at Wembley, and is a credit to the judgment of Mr. Milne Watson, Mr. Goodenough and Mrs. Cloudesley Brereton, the Gas Industry's consultant and editor of publications.

The exhibit of the British Gas Industry occupies over 12,000 square feet in the very centre of the Palace of Industry, where it cannot be missed. Not unnaturally, the Gas Industry, being one of the oldest scientific industries in the country, has a fine and valuable collection of historical documents and relics, so valuable indeed that it has been decided not to bring them up to Wembley until the remainder of the Exhibition is entirely completed and they can be guaranteed absolutely safe from damage, dust and thieves. In the meantime this interesting collection, which represents more than a century of development in resolving a lump of coal into gas, coke and all the many by-products of gas manufacture, has been assembled at South Kensington by the courtesy of the Imperial College of Science and Technology. Similarly, in some of the model rooms in the domestic section of the Gas Exhibit, the lighter and more beautiful hangings, though ready at any moment to be dropped into their place, have not been put up for fear of damage while the carrying of bricks and mortar for the completion of some neighbouring exhibits still goes on. But it is already easily seen that the interior of the Gas Exhibit is to be one of the most artistic and pleasing effects of the whole Exhibition.

Gas is, of course, in evidence elsewhere besides in the Gas Exhibit; notably in the Amusement Park, which is brilliantly lighted by 5,000 gas lamps—a proved illuminant for outside lighting.

Further Notes on the Scientific Section

A Popular Demonstration

In the centre of the scientific exhibit is the Fiery Fountain, an attractive scientific toy which will probably interest the general public more than the other exhibits of more scientific importance displayed in this section. It is not possible for the general visitor to appreciate the extraordinary importance of the contributions made by the British men of science to the progress of chemical science during the last generation; to do so requires a scientifically trained mind, and it is to the instructed visitor from home and other parts of the Empire, and from foreign countries, that appreciation and understanding are to be looked for, but everybody can appreciate a pretty, ingenious toy depending for its effect on the skilful application of science. No doubt many besides the general public will be puzzled to know how this pretty and attractive effect is obtained.

The exhibit has been prepared by the Manchester College of Technology. A good deal of work and a good number of experiments have been made to bring this device to perfection, and Principal Mouat Jones and Mr. Hodgson are to be congratulated on providing a very successful and ingenious attraction.

Inorganic Chemistry and Colloids

Professor F. G. Donnan has a very large section dealing with Inorganic and Physical Chemistry, and has arranged for apparatus or demonstrations with a number of collaborators, dealing with a very large number of phenomena of theoretical and practical interest. These include phase rule models by Brunner, Mond and Co.'s research department; specimens showing corrosion of metals, by Dr. Newton Friend; samples of original mauve and dyeings made therefrom, by Dr. Mollwo Perkin; recording hydrogen ion concentration meter for solutions, and other apparatus, by Dr. E. K. Rideal; and a historical collection of apparatus of the late Professor Sir James Dewar, shown by the Royal Institution.

The exhibits in the Colloid Section, arranged by Professor J. W. McBain, illustrate some of the theoretical results obtained by British workers, but they also clearly demonstrate the close connection with industrial application and use of colloids. The exhibits include: The filtration of colloids by the Stream Line Filter; aeronautical dope films and doped fabrics, spun silk from cellulose ethers and esters, organosols and gels of cellulose esters, etc.; clay in the raw state, colloidal clay, clay in suspension, emulsion, etc., manufactured article in dry state; rubber sols in tubes on swinging stand; the distribution of water in a gel in relation to the hydrogen ion content. The effect of hydrogen ion content in modifying the valency law of precipitation; and the coagulation of colloidal solutions. In arranging this exhibit, Professor McBain has secured the co-operation of a number of industrial firms and eminent scientists.

General Organic Chemistry

Professor J. F. Thorpe has arranged the exhibit on Organic Chemistry with the assistance of professors from all over the country. The exhibit occupies two long benches one on either side of the central "fire" fountain. Each bench carries a central upright rail on both sides of which the framed exhibits are shown. The bench space is also occupied chiefly by a framed exhibit, but a number of models illustrating the spatial relations of certain carbon compounds are also shown. It is intended that each framed exhibit should tell some complete story of organic chemical research. Specimens of the compounds employed, from the initial material to the finishing product, are contained in small glass tubes attached to cards which bear the names and formulæ. Connecting the cards are directional arrows showing the course of the various reactions, the arrow having written on them, when necessary, the name of the appropriate reagent used.

Standardised Heat Treatment Terms

A COMMITTEE appointed by American steel traders has recommended the following standardisation of terms regarding the heat treatment of steel, in view of the wide divergence in terms frequently met with in the States.

1. *Annealing.* Heating above the "critical temperature" followed by a relatively slow rate of cooling.

2. *Loneal.* Heating below the "critical temperature" followed by any rate of cooling.

3. *Normalising.* Heating above the "critical temperature" followed by an intermediate rate of cooling.

Note.—In good practice the heating is considerably above the "critical temperature."

4. *Spheroidising.* A long-time heating at or about the "critical temperature" followed by slow cooling throughout the upper part of the cooling range.

Note—For the purpose of spheroidising the cementite in high-carbon steels.

5. *Hardening.* Heating above the "critical temperature" followed by a relatively rapid rate of cooling.

6. *Tempering.* Reheating, after hardening, to some temperature below the "critical temperature," followed by any rate of cooling.

7. *Carburising.* Adding carbon with or without other hardening elements, such as nitrogen, to wrought iron or steel by heating the metal below its melting point in contact with carbonaceous material.

8. *Casehardening.* Carburising the surface portion of an object and subsequently hardening by suitable heat-treatment.

9. *Cyaniding.* A specific application of carburising where the object, or a portion of it, is heated and brought into contact with cyanide salt.

By the term "critical temperature" is meant that temperature which is customarily associated with the following phenomena:

(*a*) Hardening when quenched.
(*b*) Loss of magnetism.
(*c*) Absorption of heat.
(*d*) Formation of solid solution.
(*e*) Pronounced refinement of coarse grain upon cooling.

National Importance of a British Oil Supply

Possibilities of Oil Shale and Low Temperature Carbonisation

The author discusses the problem of securing for Great Britain an independent oil supply, and the possibilities offered by British oil shale and low temperature carbonisation. His statement of the case is interesting, though his conclusions may not be accepted by all investigators in this field.

THE occurrence of a coastal deposit of oil shale in West Somerset is directing renewed attention to the oil situation in Britain. At present 99 per cent. at least of Britain's mineral oil requirements are imported, and mainly from sources other than British. During 1923 the importations of petroleum products reached the huge total of 1,326,484,801 gallons, of which about 327,000,000 gallons represented motor spirit. Such absolute dependence on importation of a vital commodity is probably unique in any great country. The weakness of the position is obvious. Britain, like all other progressive countries, has practically staked its existence on a continuous supply of mineral oil, the principal uses for which are as motor fuel, lubricants, and fuel oil for the Navy and a considerable proportion of the merchant marine. If, for any reason, military or other, this oil failed to come to our ports, the country would be reduced to a state of comparative impotence. The great automobile service would become useless; motor cars, motor trucks, and aircraft would be practically scrap iron, while the British Navy and many merchant vessels would become useless hulks.

One naturally likes to think that the possibility of a cessation of oil imports is a contingency too remote to be taken seriously, but in adopting this view, it is possible to live in a fool's paradise. A combination of two or more powerful nations, especially if it included the United States, with all the modern instruments of war at their disposal, might destroy our command of the sea without great difficulty, and thus stop the imports of oil, as well as all other imports.

Comparison with Other Nations

In no other leading country of the world is the oil situation so precarious. France has a large annual output of alcohol, a relatively small but growing output of petroleum, and is making strenuous efforts to improve her liquid fuel position. Germany, as is well known, is year by year lessening her dependence on imported liquid fuel by the active development of her home resources in the shape of coal, lignite and shale. There has grown up in Germany in recent years a great and prosperous industry, usually referred to as the brown coal tar industry, from which she is now obtaining large quantities of motor fuel, lubricants, and other substitutes for petroleum products, with the result that, ere long, petroleum imports will cease to be of great importance. Britain alone of all the great nations seems to be content to remain in the precarious position which has been indicated.

The Coalition Government elected after the war took certain steps towards improving the British oil situation. One of these was the exploration for liquid petroleum in Britain itself; and another was an effort to secure to Britain the right to exploit the potential oilfields of the mandated territory in Mesopotamia. As to the first of these, no material success resulted, and as to the second, Britain soon found herself confronted by the hostile attitude of other countries towards any monopoly by Britain in the exploitation of the oil of this region. The United States Government in particular took a strong view in favour of the policy of the "open door" as regards these rights. Cynics have said that the United States Government was actuated solely with a view to ensuring the participation of United States oil interests in this exploitation. At any rate, the net result is that Britain shares with two or three other countries, including the United States, in the right of oil exploitation in Mesopotamia. Quite recently, United States oil interests appear to have been successful in weakening to some extent the British predominance in the exploitation of Persian petroleum. This is a matter of great importance to Britain, because Persia has been regarded as one of the chief sources of a future petroleum supply for Great Britain. The moral of these events is that Britain has no security for controlling adequate oil supplies from the Far East, apart from the grave disadvantage that such supplies are in remote countries involving an exceedingly hazardous sea transport in the event of war.

The question arises here as to whether Britain can to any considerable degree avoid this dependence on imported mineral oil? Until recently this question could not have been answered in a very confident manner. But the prospects for a large home oil-producing industry in Britain have assumed a changed aspect during the past year, partly as the result of the Somerset oil shale discovery, and partly owing to the satisfactory progress reported in the low temperature carbonisation of coal, which seems now to have reached something like a commercial stage.

With regard to the Somerset oil shale deposit, we are informed on the authority of several well-known and experienced professional men that the quantity of these shales is represented by thousands of millions of tons; that these shales are very rich in potential oil-yielding material; and that the oil they yield is of good quality, equal at least to that obtained from the Scottish oil shale deposits which have produced oil for many years.

Oil shales are found elsewhere in England, notably in Dorset and Norfolk. It is a matter of recent history that attempts to exploit the Norfolk deposits have not yet been successful, owing chiefly to the high sulphur content and the lack of a process to date which will produce a refined product in an economical way. Otherwise, the yield of oil is good, and the conditions of working the shale quite favourable.

Apparently the oil obtained from the Somerset shales is attended by no such difficulty, and if the statements regarding the deposits are not unduly optimistic, it seems that in these Britain possesses a potential source of mineral oil of a strictly commercial character and of the greatest importance.

Low Temperature Carbonisation

With regard to the low temperature cabonisation of coal, there are several British processes, of which two or three at least are being worked on commercial lines. Great attention is being given to low temperature carbonisation methods on the continent, particularly in Germany, and the subject is also prominent in the United States, Canada and Australia.

It is unnecessary for the present purpose to enter into details of low temperature carbonisation. It is sufficient to say that it is now well established that by such treatment a ton of bituminous coal of average quality will yield the following approximate quantities of products: 3 gallons of motor spirit; 16 gallons of lighting, lubricating and fuel oils; 7,000 cubic feet of a very rich gas; 14 cwt. of smokeless fuel of excellent quality; ammonia equivalent to about 20 lb. of ammonium sulphate. The present gross value of these products as they leave the retort is approximately fifty shillings, which is said to yield a fair profit.

The annual consumption of coal in Britain is from 180 to 200 million tons. This includes bunker coal which ultimately may be expected to be replaced largely by fuel oil derived from coal carbonisation. A considerable tonnage of coal is used, and doubtless will continue to be used, for producing metallurgical coke, and this yields by-products to some extent comparable with those obtained by the low temperature carbonisation of coal. It is probably not an extravagant estimate to say that 80 million tons of the coal annually consumed in Britain could be treated by the low temperature carbonisation methods with great advantage to the users of the solid fuel.

Probably the most important by-product from low temperature carbonisation of coal is the motor spirit. Eighty million tons of coal yielding 3 gallons of spirit to the ton would yield approximately a quarter of a million gallons. But it is quite practical to treat certain fractions of the heavier oil by one or more of the numerous oil cracking processes to produce at least a further 3 gallons of spirit from each ton of coal, making a total of 480,000,000 gallons, which is greatly beyond Britain's current consumption of motor fuel. The residue oils, after the removal of the light fraction used for motor spirit, are said to contain a high percentage of phenols. It has been proved that these phenols, when hydrogenated, form hydrocarbons of the type suitable for motor spirit, and thus the above estimate

of 6 gallons of spirit per ton of coal appears to be safe. The balance of the heavy oil would be available for furnishing lubricants and fuel oil far beyond the current consumption of these in this country.

Low temperature carbonisation of coal, therefore, is one very practical source of oil fuel, and from the writer's point of view is the one which can be most quickly and easily developed. The great advantage this source of mineral oil possesses is in the fact that the oil product is secondary to the production of a high-grade smokeless fuel which is the primary product. The demand for the smokeless fuel is stated to be beyond the present capacity to supply it, and the price realised for it is equal to that obtained for the best grades of coal.

By-product oil is less dependent on the market price of the moment than if it were a main product. Moreover, it must be regularly produced incident to the production of the solid product.

Mineral Oil from Oil Shale

In considering oil shale as a source of mineral oil, one has to remember that the crude product will have to bear the whole of the cost up to and including the retorting stage, and that it may be worth not more than 6d. a gallon. It is true that there may be a considerable profit in fractionating and refining the crude oil into marketable products but, after all, refining oil is a separate industry. The exploitation of oil shale, therefore, seems to call for large scale and very cheap methods if it is to be profitable. This should present no special difficulty, given a rich and easily mined material. The crude oil products of the Somerset shale are stated to contain about 10 per cent. of motor spirit, so that a large output of this substance could be obtained from a relatively small output of shale, while the actual quantity would be limited only by the scale of operations. Assuming this shale oil to be merely "topped" to obtain the 10 per cent. of motor spirit, the remaining 90 per cent, would be available as fuel oil.

A large development of a shale industry would therefore result in very large quantities of fuel oil being produced which could be sold at prices low enough to make it of the greatest assistance to industry generally.

From the two sources named, that is, low temperature carbonisation of coal and oil shale, there seems to be no doubt that Britain is well able to render herself independent of imported mineral oil. But the question arises as to the relative costs of home-produced and imported oils. In the first place, it is probably quite unsound to take current prices of petroleum products as the basis for a comparison. Notwithstanding the recent glut of petroleum in the United States, the ever-increasing demand for liquid fuel must ultimately, and possibly very soon, outstrip the acceleration of petroleum supplies. It is not improbable, therefore, that ere long home-produced oil in Britain may prove to be the cheapest oil obtainable. In the second place, if mineral oil is produced at home at some sacrifice of cheapness for a time, it seems to be well worth while. The vast sums now spent on imported petroleum would then be supporting a huge home industry giving substantial employment to thousands of people.

The writer does not share the pessimistic view expressed in some quarters that Britain's export trade must necessarily decline through the increase of productive capacity of her rivals and many of her customers, but should this view prove right, it is certainly desirable to endeavour to avoid importing material where possible, for the payment of which there may be no corresponding exports. Much of our food and a large number of raw materials must necessarily be imported, but, as shown above, there seems to be no necessity at all for Britain remaining dependent on foreign oil imports once her own potential oil resources are sufficiently developed.

The development of a home oil-producing industry in Britain, involving as it would considerable risk of capital in pioneer work, should receive the active encouragement of the Government, and it may be desirable to guarantee honest and competent enterprise in some well considered way against heavy financial loss in the initial stage of the industry. In several, if not all, of the states of the Australian Commonwealth, a bounty is offered to the first substantial producers of oil in the state, and something of this sort is well worth considering for the home country. Once firmly established, there is little fear that the industry would fail to reward those who financed the enterprise.

Carbon Black Manufacture in Canada

Some Notes on the Industry

THE High Commissioner for Canada in London has received from the Dominion Department of Mines at Ottawa the following statement on the "Manufacture of Carbon Black in Canada," prepared by Mr. R. T. Elworthy of the Mines Branch :—

"Carbon black is a material of considerable importance in the printing ink and rubber industries, both in Europe and America. Its production is practically confined to the North American continent, where large supplies of natural gas are found. The name carbon black is reserved for the light, fluffy, black powder, formed by the incomplete combustion of natural gas, and the product so obtained has properties which are not possessed by other forms of black, such as lamp black or bone black.

Uses

"The fineness of division of the carbon black particles accounts for its great value as a filler in all kinds of rubber goods, such as tyres, boots, shoes, goloshes, soles and heels, hose, sheeting, etc. Automobile tyres sometimes contain as much as 20 per cent. of carbon black, and it is claimed by many manufacturers that its use greatly increases the strength and life of a tyre.

"Carbon black is one of the chief constituents of printing and lithographic inks, yielding an intense black product that cannot be produced from other forms of black. Many ink manufacturers consider carbon black absolutely essential in compounding an ink that will meet modern requirements. This material is also a constituent of varnishes and paints, typewriter ribbons and carbon paper, shoe and stove polishes, gramophone records, and almost all articles in which a black filler is used.

Sources of Supply

"At the present time British requirements, which amount annually to about ten million pounds, are supplied from the United States. Canadian imports from the same source are about three million pounds. The American carbon black industry is located mainly in West Virginia and Louisiana, but, as many of the gas fields in these States begin to show signs of decline and conservation measures become more restrictive, the industry is seeking new fields.

"Ontario and Alberta are the only provinces in Canada possessing large resources of natural gas. Most of the Ontario fields are declining, however, and the supply is rightly restricted to domestic and industrial heating. In Alberta, the cities of Calgary, Edmonton and Medicine Hat and many of the smaller towns are supplied with the cheap natural gas, and in all but a few fields in central or southern Alberta the gas is piped to domestic consumers or is conserved for future demand. There are four or five natural gas fields in Alberta, however, where the prospects for the establishment of a carbon black industry might be considered. These are the Many Islands field, near Medicine Hat, the Wainwright field, one hundred miles east of Edmonton, and the Peace River and Pelican Rapid fields, in Northern Alberta.

"In the Wainwright and Many Islands fields, while it is believed that extensive gas sands exist, there are few wells drilled at the present time that yield large flows of gas. Another disadvantage is that the gas so far found in both these fields is of poor quality for the manufacture of carbon black and contains little or no gasoline. Transportation facilities are good. It is doubtful if permission would be granted to make carbon black in either of these areas. Large supplies of gas are known to exist in Northern Alberta, in the Peace River and Athabasca regions. Little reliable information has been collected on its suitability for the production of carbon black or on its gasoline and helium content. Transportation presents some difficulties, though the Peace River field is served by a good railway. The chief obstacle in the successful establishment of a carbon black plant in either of these areas would be the high freight costs.

"It should be borne in mind that the present demand for carbon black is limited, and that the Canadian market could be supplied by the output of two or three plants. Great Britain and the Orient are other possible customers, but the competition with the United States for this trade would be keen."

Disintegrating Mills

To the Editor of THE CHEMICAL AGE.

SIR,—In the discussion on Mr. China's paper on this subject, read at Birmingham, on April 4, regret was expressed by one of the members that the writer had confined his remarks exclusively to his own particular machine. It is possible that this feeling may be shared by a number of your readers, and the following remarks are put forward in the hope that they may be of interest to those whose curiosity has been raised by the paper and the discussion.

Dr. Maxted instanced liquid fuel as a possible field for the use of "Colloid Mills," and while the process is not probably commercially worth while in view of the present price of fuel oil, it is quite a practical scheme, and, curiously enough, it is this process which appears to be the genesis of the mills such as the "Premier," which are now finding such a wide range of usefulness.

About ten years ago inventors seem to have busied themselves with the question of dispersing solid hydro-carbons in oil to make a liquid fuel, and while frequent references may be found in patent specifications of the time to "high-speed mills," details of such machines seem lacking, although one optimistic colliodal fuel inventor desired to use a machine having a linear speed of 1,000 metres per *second*! It was probably, however, Plauson's double disc mill in 1920 and his subsequent impact-shear mill which stirred the writer of the paper and other inventors in this country (including the present writer) to turn their attention to this kind of machine.

A few words as to the distinctive methods of obtaining the hydraulic shear forces may be of interest. In the Plauson machine it is generally understood that a combination of shearing stresses and impact forces effect the disintegrations, the revolving blades leaving and re-entering the space between adjacent fixed blades with such rapidity as to impart sufficient shock to the liquid in the thin film to disrupt and disperse the suspended matter.

Mills which depend wholly upon the shearing of a liquid film, adhering with great tenacity to the relatively fast-moving confining surfaces, may be divided into two distinctive classes.

(1) Those in which the liquid is propelled through the gap by the centrifugal forces acting upon the material forming the film. They include machines having the working surfaces in the form of discs or (as in the "Premier") a flattish truncated cone, diverging from the ingress end.

(2) Those in which the surfaces confining the film are so shaped that the film does not tend to evacuate the space by its own inertia, or in which it actually tries to work back to the feed space. Both modifications of this second class are made by the writer's firm, the trade name of the machine being the "Hurrell Homogeniser."

The physical condition of the film in the case of these two classes is quite different. In the self-expelling film the liquid is delivered at or near the axis of rotation where the linear speed and area are both at a minimum, and the film is here probably a solid stream. In progressing towards the periphery, the particles of liquid increase their radial velocity, and also find increased space, so that there is every reason to suppose that the film becomes broken up into detached masses with cavities and voids between. One can conceive that approaching the periphery of the disc or cone, the liquid is shot through as a sort of spray, in which case the adhesion of the liquid to the moving surfaces would be imperfect, and detract from the effectiveness of the hydraulic shear by means of which the mill functions. The greatest disadvantage of the "self-expelling" film, however, is probably the fact that with any given material, gap, and speed of rotation, there is only one rate of feed or treatment. Now in practical manufacturing some substances require work done to them ten or a hundred times as much as others, and to effect this the material would have to be constantly returned to the mill.

Before leaving the subject of disc and "flat" cone machines, it should be noted that in addition to the drawbacks associated with the actual film shear, two mechanical drawbacks of a very vital character exist; the first being that the end thrust exerted by the liquid has to be taken up by the bearings, and all engineers will appreciate the difficulty of absorbing end thrust in a shaft revolving at 5,000 r.p.m. The second complication is that of effecting close and accurate adjustment. Since the end movement of the rotor modifies the gap clearance to an almost equal degree, the slightest amount of wear or derangement will cause an alteration of the gap to the extent of the few thousandths of an inch to which it should be set.

Coming now to the machine with which the writer is associated. It was realised at its inception that to appeal to manufacturers it would have to perform the actual operation or process required, and in addition possess the following attributes:—

(1) Easy control of the rate of working.

(2) Robust and compact construction and freedom from liability to derangement in the hands of unskilled workers.

(3) Ease of installation and absence of special foundations, since, to be used in chemical processes, it would sometimes require to be mounted on stages, over tanks, and similar situations.

(4) The working surfaces, which may be worn or damaged by foreign substances, must be readily and inexpensively renewable.

(5) A method of self-cleaning, and a smooth interior machined all over.

(6) Ability to line the interior with suitable non-corrodible metals such as Monel metal or stainless steel.

(7) Temperature control by a steam or water jacket.

(8) Straightforward gravity feed and discharge to permit heavy or fibrous solids being treated without risk of choking.

The film gap is cylindrical or nearly so; in this way the linear speed is a constant quantity at any speed of rotation, differing in this respect from mills having as working surfaces discs or shallow cones which can have a maximum efficiency at only a part of the area. Without going into too much detail, it may be mentioned that the machine has a short cylindrical jacketed stator, flat end covers each carrying a gland and ball bearing, a rotor almost fitting the bore of the stator, and having an arrangement of radial passages at mid-length, by means of which the liquids reach the film space at a pressure determined by the radial depth of liquid being whirled round, and this depth automatically responds to the rate at which materials are delivered to the hopper. In practice the pressure varies from a fraction of a pound to about 100 lb. per sq. in.

The rotor is carried centrally between the bearings on a horizontal shaft, and the whole machine is traversed along its bedplate to adjust the belt. In spite of the high film pressure available (aggregating many tons) absolutely no end thrust is set up owing to the central feed and equal discharge in both directions.

Machines permitting of adjustment are made with very slightly tapered working surfaces, and a longitudinal displacement is effected by a screwed housing which opens or closes the gap 1/1,000 in. per half turn. The set minimum clearance (generally 2/1,000) cannot be passed and the metal surfaces made to touch. The adjustment can be effected with the machine running at full speed.

In Mr. China's paper on the "Premier" mill, he mentions the impossibility of working to less than 0·003 clearance. No difficulty has been experienced by the writer in making machines with a gap of 0·001 in., and no trouble has been found in working at such fine clearances, which, however, do not seem to offer any very great advantages. High speed, however, does seem to be of crucial importance, especially in the comminution of crystalline solids, and a machine has been successfully used with a speed of 8,000 r.p.m., the rotor being 20 in. diameter, the linear speed approximating to 40,000 ft. per minute.

In the field of emulsifications, high speeds do not seem to be so necessary, some of the commercially most important emulsions being comparatively easily effected at 10,000 ft. per min. It is a matter of some surprise, therefore, to hear that creosote-water emulsion was considered difficult to make satisfactorily. The writer has some in his possession which has been standing for twelve months, and which will pass through filter paper, and in which the whole of the oil particles are sufficiently fine to show the Brownian movement. The ease with which creosote emulsion can be made does not, of course, lessen the attractiveness of the proposal to creosote timber with an emulsion. The process appears to be one of those re-inventions which have great commercial possibilities at the present time.—Yours, etc.,

G. C. HURRELL.

Sun Lane Engineering Works,
Blackheath, S.E.3.

Industry as a Career for Scientists

By Alwyn Pickles, M.Sc.

The author, himself a senior science master, offers some suggestions on modern methods of science teaching and on industry as a career for scientifically trained men.

A DISQUIETING feature of present-day unemployment is the large number of young people who are finding it difficult and in many cases impossible to obtain the kind of work for which they have been specially trained and for which perhaps they possess natural ability. The matter is now of some urgency even in our secondary schools, where most of the boys leave between the ages of sixteen and nineteen, but the position is far more acute in the case of the universities. Large numbers of young men left the universities of this country last June and July who are still without employment or who are doing work other than that for which they were trained. This is especially true of those who took up science as a career, for considerable over-production of scientists has coincided with an abnormal depression in trade. The result has been that industry has not absorbed trained scientific material to the extent that was hoped for during the years 1916 to 1919. Even granted normal trade conditions, it is very doubtful whether all those qualified in science leaving the universities during this last year or two could have been absorbed by the several industries. There are many reasons for the present unfortunate position, and a study of them may possibly be helpful.

A False Boom in Science

1. As far back as 1864 a Royal Commission on Public Schools called attention to the neglect of science. At the time of this Commission the only instruction in science at one of the largest public schools in the country was given on Saturday afternoons by a visiting teacher with apparatus so poor and meagre that the experiments seldom succeeded. The subject was treated with contempt by the boys, and was not taken seriously by the parents. Though things improved later, it was often the case that boys who did science were those who were failures at classics or at mathematics. When it is remembered that many business men of the present day were brought up under these conditions it is easy to understand the scepticism with regard to science that exists in some quarters.

The year 1914 showed clearly and painfully that we as a nation had neglected science. Our shortcomings in this direction were obvious to all, and for a time everyone was prepared to receive science with open arms and give it of our best. In 1916 the then Prime Minister, Mr. Asquith, appointed a Royal Commission to inquire into "The Position of Natural Science in the Educational System of Great Britain." The Report fo the Commission was presented in 1918 (Cd. 9011), and much that it contains makes very interesting reading, especially in the light of present-day conditions. The widespread enthusiasm of the war years for science did not mislead the experienced men who drew up the Report. One remark at least shows that they were not so sure of the persistence of the public clamour for more science. "Temporary enthusiasm needs to be fortified by some more binding material. Good will is much, but good will weakens. It ought not to be beyond the wit of man to devise a scheme of education securing that every child should be equipped with a knowledge of science."

Though the Report is concerned mainly with science as an educative subject its potential value to industry is freely recognised. "The war has increased the urgent need for action. It certainly gives no excuse for the postponement of the start to recover lost and to win new ground. Such ground will never be surely held unless it is slowly won. But it will never be won at all unless the present opportunity is seized. How necessary science is in war we have learnt at a great price. How it contributes to the prosperity of industries and trade all are ready to admit, and a nation thoroughly trained in scientific method would no doubt reap a rich material harvest of comfort and prosperity."

It is possible that later sections of the Report were misconstrued, especially by large sections of the Press, who boomed science without due thought. These sections deal with the supply of trained scientific workers for industrial and other purposes, and many true but unpleasant facts were stated about the lack of correlation between industry and scientific thought. Perhaps one quotation was seized on more than any other, and its constant repetition in newspapers all over the country suggested science as a career to so many that the present surplus of trained scientists may be one of the results. The quotation was from the Report of the Advisory Council for 1915–1916 (Cd. 8336), and reads as follows:—"It is in our view certain that the number of trained research workers who will be available at the end of the war will not suffice for the demand which we hope will then exist." This hope, as we well know, was not fulfilled. Science is now one of the overcrowded professions, one of the reasons being injudicious booming during the war years.

2. During the war, properly trained scientists were scarce, and for the time being the demand for such was abnormally great. Hence many who knew a little science and who were unfit for active service readily obtained positions, say as chemists, in industrial concerns. In some cases they did good work, but in many other cases they were failures. The saying that "The evil men do lives after them" was never better illustrated, and such examples are quoted again and again, losing nothing in the telling, to illustrate the failure of science to help industry. Time alone can remedy the unfortunate impressions created in some quarters.

The Education of Industry

3. THE CHEMICAL AGE for November 3, 1923, stated in one of its editorial articles that while scientists must be taught to know what industry requires of them it is also necessary that business men should know exactly what science can do for them. Education is necessary from both sides.

The source of all trained scientific material is, of course, the secondary school and the university. Teachers in these places often wonder if business men really appreciate the fact that instruction in science to-day differs very considerably from the instruction given in their own day. A boy seldom leaves school before the age of sixteen, and since science is a compulsory subject he has some knowledge of the use of scientific apparatus, and, what is more important, he has some idea as to what is meant by "scientific method." In nearly every case he leaves with the School Leaving Certificate of one of the universities, and in many cases he will have the matriculation certificate of London University. Should the boy stay at school until he is eighteen he will have the Higher School Certificate, with a possibility of the London Intermediate B.Sc. Meanwhile his general education has not been neglected, and he is still of an "adaptable" age, so that with proper encouragement he would be a valuable acquisition to any business house.

The university man is often regarded as too much of a theorist, but that is not quite true. Science work at most of the universities is decidedly practical in nature, and the students are in constant touch with the most recent developments. In most cases they have an original outlook and initiative, the last named being a quality that is much needed in British industry. It is doubtful whether science men from the universities have as yet been given a fair trial in British industry.

Clearer Views of the Situation

4. While it is right that the business man should be shown what he may expect from scientists at different stages of their training, it is equally right that parents of boys seeking a scientific career should be told what is expected. It cannot be too strongly emphasised that the science of the class-room and laboratory does not fit one for a career as an industrial scientist without further specialised training. Parents are apt to forget this, and at one time it was very common for boys to decide on "something in the science line" because their parents had "read in the paper" that science was the coming profession. To-day it is noticeable how few boys think seriously of taking up science as a career, but it is also noticeable that in every case they are entering into the work with their eyes open and under no delusion as to the difficulties. In a few years this attitude will show its effect, and

the resulting scientists will be of great value to whatever industry they chose to enter. Their value will be gradually appreciated, and the demand for more such scientists will follow.

The Headmasters' Conference recently met at Winchester. One subject for discussion was the correlation of work in school with the requirements of industry. While it was held that a general education was the first requirement, it was also thought advisable that the later stages of school work should be somewhat adapted to the needs of the various industries. This could be done by co-operation between headmasters and business men, and the cry that modern education is useless for industry would soon disappear. The idea is good and much should come of it, for headmasters control the supply and business men control the demand—that is, for those who desire to enter on an industrial career. What will become of the suggestions put forward at Winchester remains to be seen. The move is in the right direction and deserves every encouragement.

The Manufacture of Grapestone Oil

A Growing Industry Abroad

THE extraction of fatty oil from grapestones has long been an established industry both in California and in Italy, and during the past few years increasing attention has been given to the matter in France. Enormous quantities of the raw material (*pépins de raisins*) are available, and in 1918 the Service du Ravitaillement offered to purchase this material at the rate of 12 frs. per 100 kilos of dried grapestones, containing not more than 15-20 per cent. moisture and 5 per cent. impurities, but little progress was made until last year (1923).

In California, where some 4,000 tons of grapestones are produced annually, the yield of oil is about 350 tons, beside 700 tons of syrup, 400 tons of tannin, and 1,500 tons of cattle food. In France it is estimated that there should be 150,000 tons of material available, from which 10,000 tons of oil could be obtained. 100 kilos of grapes give 2 to 5 per cent. of stones, and 100 kilos of skins or husks (*marc*) yield 20 to 23 per cent. of grapestones, and from these in turn about 5 or 6 per cent. of good edible oil is obtained by cold pressing. By hot treatment with boiling water the yield of oil is 10 per cent., but is of inferior non-edible quality.

The most recent developments in France were undertaken in 1923, on the initiative of M. J. Bonnet, Director of the Serivce de l'Olèiculture, some particulars of which are given in *Les Matières Grasses*. A co-operative society called La Catalane was established at Perpignan, and works erected for extracting the oil by the Bonnet process, similar to that used for the manufacture of second grade olive oil. About 8,000 tons of material are to be treated per annum, giving a yield of 11 or 12 per cent. of commercial grade oil. The manufacture of the oil comprises four stages: (1) Separation of the stones from the skins or *marc*, (2) grinding and drying, (3) extraction, and (4) purifying or refining.

The separation is a fairly simple and straightforward operation, and the requisite apparatus is essentially a series of rapidly shaking sieves, connected with the necessary elevators and conveyors. The stones pass through two cylindrical rotating double-walled driers, heated by steam, and thence into a disintegrator. The crushed grapestones are next subjected to extraction by trichlor-ethylene. This solvent is introduced into the lower part of the extractor, which is connected with a still about half the capacity of the extractor. The mass is treated with solvent for about five hours, or until the still is sufficiently full of liquid and it becomes necessary to distil the solvent to make vacuum before introducing a fresh mixture of oil and solvent. Distillation is continuous, for the solvent is constantly vaporised by the heat of the steam and passes into the condenser, whence it is again ready for use. After extraction is complete, the solvent is passed off and steam introduced, and at the same time, the extractor being shut off from the still, the steam carries the solvent vapours into the condenser, where both solvent and steam are condensed. The residual mass, still impregnated with solvent, is dried in four or five hours, so that the total time taken is eleven or twelve hours for dealing with a batch of 2 or 2½ tons. The amount of solvent used at Perpignan is kept as low as possible, and does not exceed half a kilo per 100 kilos of material treated. The residue contains about 2 per cent. nitrogen, 0·5 per cent. phosphoric acid, and 0·75 per cent. potash (presumably K_2O), and might have some value as manure, concerning which some tests are now in hand. It seems to have been taken for granted in France that the extraction process, giving a higher yield of oil but of lower and non-edible quality, and using the residue as fertiliser, is more economical than the cold pressing employed in California, yielding a high quality edible oil and cattle-food. It is understood that the factory at Perpignan, which began operations in April, 1923, will have dealt with 3,000 tons of *marc* during 1923, giving 400 tons of grapestones and 45 tons of oil. The latter has been sold at 250 frs. per 100 kilos. The results so far are considered to have been sufficiently satisfactory to warrant considerable extension in the grape-growing districts of France.

Chemical Matters in Parliament

Proposed Swiss Dyestuffs Agreement

Mr. G. White (House of Commons, April 15) asked the President of the Board of Trade if his attention had been drawn to the fact that negotiations were proceeding between the I.G. and Swiss dyestuffs manufacturers with the object of fixing standard prices and eliminating competition.

Mr. Webb, in replying, said that he had no information bearing out the suggestion.

Scottish Shale and Oil Industry

Mr. Clarke (House of Commons, April 15) asked the President of the Board of Trade if he had made any representation through the Government representatives to the executive board of the Anglo-Persian Oil Company as to the position of the Scottish shale and oil industry, in terms of the promise given some time ago in an interview with the workmen's representatives; and, if so, what action was he likely to take in the matter, in view of the anxiety which prevailed in the shale and oil districts?

Mr. Webb: I have been in correspondence with the company on this subject. As my hon. friend is, however, aware, the Government have no legal right to control the conduct of this industry and can only draw the attention of the company to the various points which have been raised. I have previously intimated that any danger of an early closing down of operations is happily removed, and I am assured that no such step will at any time be taken without adequate notice.

Disposal of Munitions

Mr. Hogge (House of Commons, April 15) asked the Financial Secretary to the Treasury the original contract price agreed on by the Disposal Board with George Cohen, Sons, and Co.; what modification, if any, was subsequently made in the contract; whether the Disposal Board relieved George Cohen, Sons, and Co., of the bulk of the gas ammunition and dumped it in the sea at the public expense; and whether he could state the value of this gas ammunition and the actual cost of the dumping operations?

Mr. Graham, in replying, said that the contract price for ordinary shell was £4 12s. 6d. per ton, except at one depot, where the price was £4 per ton; for gas shell, the price was £1 per ton. The contract was for 150,000 tons of shell and such additional tonnage as became available after the date of the contract. Owing to the reduction of War Office and Admiralty reserves, the quantity which ultimately became available for breaking down much exceeded what was originally anticipated by these Departments. Of the gas shell, 8,000 tons were broken down; 7,000 tons were dumped on the recommendation of a technical committee, representing the Government, which advised that that was the only method of disposing of the material without danger to human life. Apart from this gas shell, it had been necessary to dump at sea, approximately, 200,000 tons of gas shell, etc., since the armistice.

Formaldehyde as Meat Preservative

Mr. Wheatley, Minister of Health (House of Commons, April 16) replying to Viscount Curzon, said that the consignment of meat which was treated with formaldehyde as a preservative arrived at the Port of London on March 31, and was inspected by members of the Departmental Committee on the Use of Preservatives in Food on April 3. Since that date the Port medical officer had satisfied himself that apart from the presence of formaldehyde the whole consignment was

unfit for food. He understood that the Departmental Committee proposed to issue an Interim Report dealing with the treatment of meat by formaldehyde, and, pending the issue of that Report, he was not in a position to make any statement as to the future.

From Week to Week

THE NATIONAL DRUG AND CHEMICAL UNION, with other unions, having members in the drug and fine chemical industry, have submitted a new programme to the employers, asking for wages as follows :—Men : Grade 1, 75s. ; Grade 2, 70s. ; and Grade 3, 65s. per week. Women : Grade 1, 45s. ; Grade 2, 40s.

AN AMERICAN CHEMIST, who had his eyes injured by sulphuric acid six years ago, and who has since suffered considerably from his injury, received treatment at the Royal Infirmary, Liverpool some weeks ago. The surgeon performed an operation of grafting, taking the skin from the patient's arm, with the result that two new lids have been formed.

SPEAKING at a meeting of the Royal Microscopical Society in London on Wednesday Sir Charles Parsons said he had been trying to make diamonds for twenty years, and had spent £20,000 on his experiments. He had come to the conclusion that nobody had ever made a diamond, and that consequently the claims of Moissan, the great French chemist, and our own Sir William Crookes were mistaken.

THE GENERAL ELECTRIC CO., LTD., of Kingsway, London, announce that they have secured a contract from the Metropolitan Water Board for the supply of gas-filled lamps for the twelve months commencing April 12, 1924. The same firm have recently carried out a new lighting scheme at William Whiteley's stores, Bayswater, London, using gas-filled lamps with a special tinted glass which absorbs red and yellow rays, giving an effect approximating to daylight.

AT THE INQUEST arising our of the accident involving the death of two men, which occurred at the Midland Tar Distillery Works, Oldbury, on Monday, April 14, the coroner stated on Friday that the men met their deaths by being overcome by fumes while at work, and another man was also gassed at the same time. The latter was in hospital at West Bromwich. Only formal evidence was taken. Dr. Mence said death was due to asphyxia. He could not give a scientific name to the gas from the post-mortem examination, but it would be a naphtha or benzol product. There was plenty of oxygen available and plenty of men to assist and they did their work well. The inquiry was adjourned.

THE SEVENTH ANNUAL GENERAL MEETING of the Society of Glass Technology was held at Sheffield University on Wednesday, April 16, Professor W. E. S. Turner presiding. Papers were read by Mr. J. H. G. Monypenny and Mr. W. R. Barclay, and an exhibition and demonstration was given of special and stainless steels capable of being used in the glass industry, especially for heat resisting purposes. The officers elected were : President, Col. Halse, C.M.G., of Castleford ; vice-presidents, Messrs. F. G. Clarke, of Rotherham, and R. L. Frink ; members of the Council, Messrs. H. Bateson, W. R. Dale, J. Moncrieff, W. J. Rees, J. H. Steele, and H. Webb ; treasurer, Mr. J. Connolly ; secretary, Mr. E. English.

FRENCH CHEMISTS have perfected new methods of identifying pictures, according to the American Chemical Society. They use groups of red, blue, green, or white light to light the picture, and they examine the suspected canvas with the spectrometer. Employment of these various colours puts in relief the retouchings, scrapings, and changed signatures which constitute a false picture. By employing the ultra-violet ray they make the zinc white and certain varnishes stand out by fluorescence. Finally, by scraping off very small amounts of paint, they have made spectrographic analyses of them, and have been able thus to determine, for example, in a false Renoir, the presence of a cadmium yellow, when Renoir only used chrome yellow.

THE COUNCIL OF THE COLLEGES in connection with the University of Durham, in conjunction with the Durham County Council Education Committee, propose to open a new Department of Pure Science at the beginning of the Michaelmas term this year. New and spacious laboratories and lecture rooms, designed upon the most modern principles, are in course of erection upon a site of 10 acres at the junction of the Stockton and Darlington roads. The new Department will have a staff of professors and lecturers, and the general supervision will be under the administration of the Joint Board of the College and the County Council. The plans and specifications, which have been prepared under the personal supervision of Dr. W. N. Haworth, Professor of Organic Chemistry in Armstrong College, Newcastle, include provision for the teaching and demonstration of Chemistry, Physics, Geology, and Botany. Scholarships are to be awarded, and the course of study will lead to the B.Sc. degree (pass or honours) of the University.

THE AFTER-EASTER SESSION at the Royal Institution opens on Tuesday, April 29, when Professor Barcroft begins a course of four lectures on " The Effect of Altitude on Man." The Tyndall lectures will be delivered this year by Major M. S. Tucker, Director of Sound Ranging in the Army, on " Acoustical Problems." On Wednesday, April 30, and Thursday, May 8, Mr. F. Balfour Browne will give two lectures on " Social Life among Insects " ; on the succeeding Thursday afternoons Dr. E. V. Appleton will deliver two lectures on " Atmospheric Interference on Wireless Telegraphy," and Dr. C. G. Seligman two lectures on (1) " Divine Kings and Rainmakers of the Sudan," and (2) " The Veddas of Ceylon." On Saturday afternoons, beginning on May 3, there will be two lectures by Dr. F. A. E. Crew on " Heredity and Sex " ; two by Dr. W. G. Alcock on (1) " How Music is Made," (2) " Musical Ornamentation ; its Origin and Development " (with musical illustrations), and two by Mr. C. Nabokoff on (1) " Shakespeare in Russia," and (2) " The Historical Triology of Alexis Tolstoi." The Friday evening meetings will be resumed on May 2, when Sir Alexander Kennedy will deliver a discourse on " Petra." Succeeding discourses will probably be given by Professor V. F. K. Bjerknes, Dean Norris, Lord Rayleigh and others.

Chemical Engineering Group: Annual Meeting

THE annual general meeting of the Chemical Engineering Group of the Society of Chemical Industry will be held at 6.30 p.m. on Friday, May 2, in the Watt Room of the Engineers' Club, 39, Coventry Street, London, W.1. The Chairman of the Group, J. Arthur Reavell, Esq., M.I.M.E., M.I.Chem.E., will preside. After the meeting an informal dinner will be held in the same room of the Club, the cost of which will be 6s. 6d. each, exclusive of wines. Visitors are eligible to attend the dinner and the subsequent proceedings, but the Secretary would be glad if they would obtain and forward as soon as possible a form of application for places at table if they intend to be present. No remittance need be sent with the application, as the cost of the dinner will be collected at the tables. Following the dinner a free and easy social evening will be held, and arrangements are being made for a number of musical and other items. Those who attended the proceedings on the occasion of the annual meeting and dinner during 1923 will agree that the function was extremely enjoyable, and it is hoped that on the corresponding occasion this year an equally pleasant entertainment will be afforded.

Casein Manufacturer's Affairs

AT Bankruptcy Buildings, London, on Thursday, April 17, the first meeting of the creditors was held of Nicholas Arie Cornelius Ouwehand, of Dulwich Village, S.E., casein manufacturer, lately carrying on business at 24, Gt. Dover Street, London, against whom a Receiving Order was made on April 2, 1924, on the petition of the liquidator of The British Casein Co. (1911) Ltd. The debtor stated in his preliminary examination that he had always been interested in casein. He came to England from Paris in 1903, and in 1907 he formed The British Casein Co., Ltd. In 1911 The British Casein Co. (1911) Ltd., took over the interests of the before-mentioned company. Debtor was appointed managing director of the new company, which went into compulsory liquidation in May last, and it was in respect of a judgment obtained against him in November for money lent to him by the company that the bankruptcy proceedings had been taken. Apart from a claim for income-tax, he had no other liabilities. He had received practically no income since the failure of the company, with the exception of a little commission on a few deals. He returned the petitioning creditor's debt at £1,508, and the Collector of Taxes £250. No assets were disclosed. The estate remains in the hands of the Official Receiver for administration.

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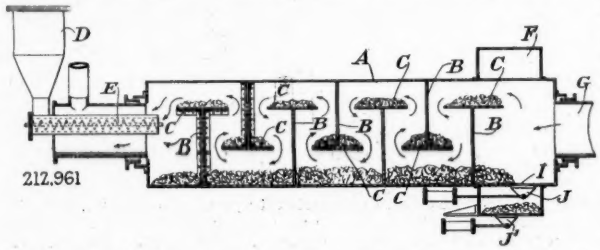
Abstracts of Complete Specifications

212,961. Rotary Retorts, Kilns, Dryers or the Like. H. Nielsen, 13, Firs Avenue, Muswell Hill, London, N.10, and B. Laing, Abdale House, Hatfield, Herts. Application date, November 21, 1922.

A retort *A* is provided with baffles *B* attached to the inner wall, carrying plates *C* parallel to the axis of the retort. The material is supplied through a hopper *D* to a conveyor *E* and thence to the retort. The retort is heated internally by the sensible heat of producer gas which is admitted through the inlet *G*. The material in the retort is alternately picked up and dropped by the plates *C* during rotation, and the hot gases pass



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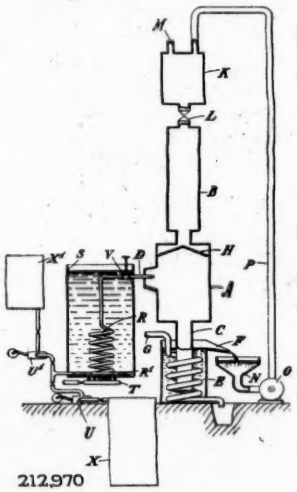
through the falling material. The plates *C* may be bent or corrugated, and may be disposed so that a helical passage is provided for the gas passing through the retort. The treated material is discharged intermittently through the opening *I* to a sealing chamber *F* in which it is cooled. The valves *J*, *J*^{1} are operated alternately so that the chamber *F* operates as an air lock.

212,970. Organic Compounds, Manufacture of—by Reactions involving Replacement of Substituent Atoms or Groups with Liquid Reagents. W. V. Shannan, N. E. Siderfin, and W. G. Adam, of the Gas Light and Co., Beckton, London, E.16, and the Gas Light and Coke Co., Horseferry Road, Westminster, London, S.W.1. Application date, December 16, 1922.

This invention is illustrated by its application to the production of *o*- or *p*-nitraniline from the corresponding nitro-chlor-benzenes by heating the latter with ammonia solution



212,970

under pressure; also by the production of phenol, or substituted phenols by heating chlor-benzene with caustic soda. The parent compound is treated with excess of the reagent, which is a solvent of the reaction product, but not of the parent substance, and the reagent is kept in continuous movement over the surface of the stationary parent substance. The latter may be substantially constant in quantity, and may be intermittently renewed.

A charge of fused *p*-nitro-chlorbenzene is supplied from a tank *X* to a horizontal coil *R*^{1} to form a layer along the bottom. The free space and the upper coil *R* are then filled with ammonia (0·880) solution from the tank *X*^{1} till the liquid runs from the nozzle *D*. The valves are closed, and the temperature raised to 180° C. Ammonia is again added until the pressure is at least 50 lb. above the vapour tension at that temperature—*i.e.*, about 700 lb. per sq. in. The valve *V* is then slightly opened, and ammonia is continuously supplied so that it passes slowly over the nitrochlorbenzene to the nozzle D. The mixture discharged consists of a solution of *p*-nitraniline and ammonium chloride in aqueous ammonia. This mixture is atomised into the expansion chamber *A* which is at normal temperature and pressure, and becomes gradually more concentrated until *p*-nitraniline crystallises out and is carried by liquor from the scrubber *B* into the pipe *C* and vessel *E*. The mixture overflows on to the filter *N*, and the filtrate is forced by the pump *O* to the feed receptacle *K*, so that it takes the place of the water initially supplied to the scrubber. The *p*-nitraniline obtained is very finely divided and of high purity, and is directly available after drying for the production of dyes, without the grinding usually required. The ammonia may be recovered separately by reducing the amount of condensing liquor. The process avoids the danger and incovenience of working with a single large bulk of liquid at high temperature and pressure. The process is also applicable for reactions at ordinary pressure—*e.g.*, the manufacture of dinitrophenol from dinitrochlorbenzene.

212,990. Separating Oxidised Fatty Acids from Non-Oxidised Fatty Acids. G. Petroff, Tischwinskaja Strasse 5, Wohnung 22, Moscow. Application date, December 20, 1922.

Fatty acids, obtained by the saponification of strongly oxidised linseed oil and the decomposition of the soap by dilute sulphuric acid are dissolved in ethylalcohol and extracted twice with petroleum and then once with benzene at 90°—100° C. The unoxidised fatty acids are thus extracted from the alcoholic solution, and by the evaporation of the latter the oxidised fatty acids are recovered. The oxidised acids are not soluble in benzene. Other hydrocarbons, such as toluene, xylene, turpentine, etc., may be used in place of benzene.

213,040. Carbonisation of Fuel such as Coal, Lignite, and the Like. W. E. Davies, 119, Victoria Street, Westminster, London, S.W.1. Application date, January 18, 1923.

The process is for carbonising coal, wood, peat, lignite, or cannels containing 15–45 per cent. of volatile matter, at temperatures above 500° C. to produce coke or semi-coke. The fuel is heated at a quicker rate than usual by combined external and internal heating. The heat transmission is one inch per hour when working at or above 1,000° C., or half-inch per hour at or above 750° C. The amount of internal heating is determined in accordance with the caking properties of the material. The heating may be effected on both sides of the charge, or on one side only, the gases being then withdrawn through the cold opposite side. Particulars are given of the method of blending and grading the coal.

213,046. Destructively Distilling Petroleum or Mineral Oil from Oil Shales, Bituminous Coal and other Hydrocarbonaceous Material. A. Stalli, Cousino Building, 57, Blanco Street, P.O. Box 638, Valparaiso, Chili. Application date, January 22, 1923.

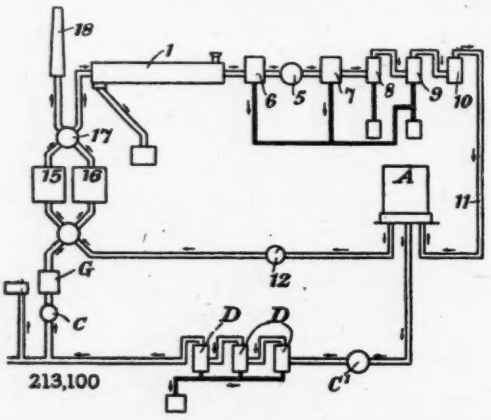
The necessary temperature to evaporate the petroleum contained in oil shale or the like is obtained by the combustion of part of the shale by natural draught only. A closed furnace is used with an automatic hopper to maintain the charge of material under treatment, and a number of condensers in series, containing pebbles of graduated sizes, adapted to operate without a circulating cooling agent. Two types of oils are obtained, a heavy oil rich in paraffin and olefine in the first two condensers, and a lighter oil rich in volatile substances in the remainder of the condensers.

213,088. ACETATE OF ALUMINA, MANUFACTURING BY ELECTROLYSIS. H. Cruse, 48, Stockport Road, Hyde, Cheshire. Application date, February 26, 1923.

In the manufacture of acetate of alumina, known as "red liquor" in the dyeing industry, calcium acetate is first made from acetic acid and calcium oxide, and is then treated with aluminium sulphate, yielding aluminium acetate and calcium sulphate. In the present invention aluminium acetate is formed directly by passing a current through aluminium electrodes in an electrolyte of acetic acid or pyroligneous acid. The current and E.M.F. are kept as low as possible, and the end of the reaction, when the solution is a neutral salt, is indicated by a falling off in the current.

213,100. DISTILLING CARBONACEOUS MATERIAL, APPARATUS FOR. W. P. Perry, Wrentham, Church Road, Leyton, London, E.10. Application date, March 12, 1923.

A distilling chamber or kiln 1 is heated internally by hot gas, and the volatile products are drawn off through a vacuum condenser 6 and exhauster 5 to a pressure condenser 7 and ammonia scrubber 8. The gases then pass to an oil scrubber 8 and lime scrubber 9, some of the gas being passed direct from the condensers 6 and 7 to the scrubber 9. The refined gas passes through another scubber 10 and pipe 11 to a bell A,



213,100

The bell is connected through a booster 12 to a 4-way valve 14, leading to regenerators 15, 16, and thence through another 4-way valve 17 to the kiln 1 or stack 18. A parallel circuit leads from the bell *A* to a compressor C^1, oil scrubbers *D*, and compressor *C* to a furnace *G*. Part of the gas is thus drawn off for further refining before it reaches the heater.

213,195. CHARCOAL, MANUFACTURE OF. A. G. Bloxam, London. From Akt.-Ges. für Anilin Fabrikation, Berlin, S.O. 36. Application date, September 25, 1923.

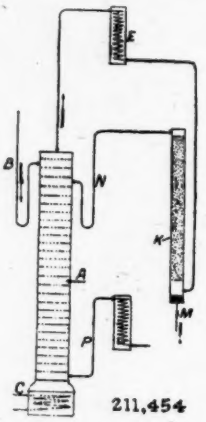
Wood or other cellulose material is impregnated with alkali bisulphate, heated above 500° C. and the alkali sulphide extracted with water. Instead of alkali bisulphate, alkali sulphate and ammonium sulphate may be used. An active charcoal is obtained.

NOTE.—Abstracts of the following specifications which are now accepted appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—190,114 (G. Poma and G. Pellegrini) relating to Acid H. (amino naphthol-disulphonic—1 : 8 : 3 : 6) see Vol. VIII, p. 152; 197,903 (W. J. Mellersh-Jackson—Soc. Anon. J. Cockerill) relating to the treatment of ores containing iron or other metal, see Vol. IX., p. 69.

International Specifications not yet Accepted

211,454. DEHYDRATING ALCOHOL. Soc. Ricard, Allenet, et Cie, Distilleries des Deux-Sèvres, Melle, Deux-Sèvres, France. International Convention date, February 15, 1923.

Aqueous alcohol is mixed with hydrocarbons, alkyl chlorides, chlorides of ethylene or acetylene, carbon tetrachloride, esters or ethers, so that when the mixture is distilled a constant boiling mixture of alcohol, water and the added liquid is obtained. The residue is further distilled to obtain dehydrated alcohol. The constant boiling mixture is treated with a dehydrating agent such as sodium or potassium carbonate, and returned to the apparatus. A mixture of aqueous alcohol and ethyl acetate is distilled in a column A



211,454

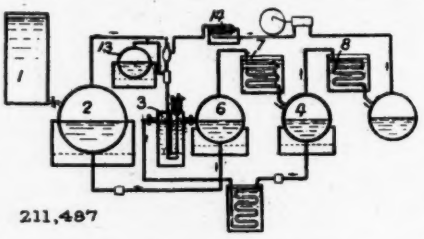
heated by a coil C, and the distillate passes to a condenser E. This distillate is dehydrated in an apparatus K and returned through a pipe N to the column. Dehydrated alcohol is drawn off through a pipe P.

211,461. ACETYLENE. F. Gros, 124, Rue de Provence, Paris. International Convention date, February 14, 1923.

Acetylene is passed through a tube containing ordinary or activated charcoal, or electrode carbon which is heated by an electric current. Glass, porcelain, quartz, silica, coal, or non-catalytic metals may be used, but must be externally heated. The issuing gas may be used to pre-heat the incoming acetylene. Benzene, toluene, and naphthalene, with some methane and hydrogen are formed, and the aromatic hydrocarbons are separated by cooling or absorption. The methane and hydrogen may be otherwise treated.

211,487. OBTAINING SATURATED HYDROCARBONS FROM CRUDE PETROLEUM. A. Schwarz, Montclair, N.J., U.S.A. International Convention date, February 13, 1923.

The crude oil is mixed with lower-boiling saturated hydrocarbons, vaporised, and the composition of the vapours adjusted to give an increased proportion of low-boiling saturated hydro-carbons on cooling. Crude oil passes from a tank 1 to a still 2, and the vapour is mixed with uncondensed gas



211,487

from the process, and with steam from a boiler 13. The vapour is injected into a mixer 3, together with residual oil from a still 4, and the mixture passes to a still 6 heated to 500°–600° F. The vapour passes to a condenser 7 and the condensate to a still 4, where gasoline is distilled off. The gasoline is condensed in a coil 8, and the gases pass on to a cooler 14 and to the mixer 3. Crude oil vapour and gas oil or kerosene vapour may be mixed and the mixed vapour passed to a condenser. The uncondensed gases may be added to the vapour mixture.

211,488. SODIUM SULPHIDE AND DOUBLE SULPHIDES. H. Freeman, Vancouver, and Canada Carbide Co., Ltd., Montreal, Canada. International Convention date, February 14, 1923.

Sodium sulphate is reduced by means of coal in an electric furnace, in the presence of sulphide of potassium, an alkaline

earth, or a heavy metal. These may be produced by reduction of their sulphates *in situ*. These additions render the mixture more readily fusible. If the additions are in molecular proportions, a double sulphide is obtained. If a sulphide of copper, lead, zinc or iron is employed, it may be in the form of an ore or refined sulphide, and the product is leached with hot water to dissolve out the sodium sulphide. If an alkali or alkaline earth sulphide is employed, it may be left in the product.

211,494. VULCANISING INDIARUBBER. Naugatuck Chemical Co., Elm Street, Naugatuck, Conn., U.S.A. (Assignees of S. M. Cadwell, 200, Ames Avenue, Leonia, N.J., U.S.A., and O. H. Smith, 2442, Morris Avenue, New York). International Convention date, July 13, 1922. Addition to 174,915. (See THE CHEMICAL AGE, Vol. VI, p. 465.)

This process for accelerated vulcanisation makes use of a mixture of rubber, an amine, a metal compound, a material providing sulphur, and carbon disulphide or oxysulphide. Two or three of these additions are mixed with the rubber, and the remainder are added by permeation from another medium without changing the shape of the rubber mass. The metal may be zinc, mercury, lead, cadmium, copper, arsenic or manganese, and suitable amines and derivatives of carbon disulphide are those mentioned in specification 177,493 (see THE CHEMICAL AGE, Vol. VI, p. 705). Some of the ingredients may be combined in a single compound, *e.g.*, oxynormal-butyl-thiocarbonic disulphide (carbon disulphide and sulphur) and zinc butyl xanthogenate (zinc and carbon disulphide). In one example a sheet of rubber containing zinc oxide and sulphur is painted with dibenzylamine and carbon disulphide, and in another example, rubber containing zinc butyl xanthogenate and dibenzylamine is treated with a solution of sulphur.

211,507. CHROMIUM AND IRON OXIDES AND SALTS. Soc. Anon. Compagnie Générale des Produits Chimiques de Louvres, Louvres, Seine-et-Oise, France. International Convention date, February 16, 1923.

Chromite is reduced by carbon or hydrogen, and the reduced ore is heated with dry gaseous hydrofluoric, hydrochloric, hydrobromic or hydriodic acid. The iron is volatilised as the halide, and collected. The residue is treated with free halogen to obtain the chromium salt, and the latter with sulphuric acid to obtain the sulphate. Alternately the chromium salt may be treated with air containing chlorine, at 300°–500° C. to obtain chloro-chromic acid. This may be passed through a heated tube to obtain chromic acid or chromium oxide and recover the hydrochloric acid. The halogen in the iron halide may be recovered by heating in oxygen.

211,831. SULPHUR BURNERS. Texas Gulf Sulphur Co., 41, East 42nd Street, Manhattan, New York. (Assignees of W. H. Kobbe, 41, East 42nd Street, Manhattan, New York.) International Convention date, February 21, 1923. Addition to 202,283. (See THE CHEMICAL AGE, Vol. IX, p. 402.)

Sulphur is burnt in a stack of square pans, each of which has a depression in the middle of the upper edge of each side, so that the pans may be stacked one upon another alternately diagonally. Overflow holes are provided in the sides of the pans to maintain a constant level, and the pans are arranged in a casing having a melting pan at the top.

Specifications Accepted, with Date of Application

192,089. Facilitating chemical or physical reactions in masses of loose material, Method of and means for. J. J. Deschamps January 21, 1922.

200,810. Para-amino-benzoyl derivatives of 2-methyl-4-diethylamino pentanol-5 and 2-methyl-4-dimethylamino pentanol-5. Chemische Fabrik Flora. July 14, 1922.

201,941. Silicates of the basic dyestuffs, Manufacture of. W. Eberlein. August 7, 1922.

204,721. Arseno-benzene derivatives. Farbwerke vorm. Meister, Lucius and Brüning. September 29, 1922.

213,631. Cellulose acetate, Manufacture of. L. A. Levy. November 3, 1922.

213,638. Separation of arsenic and tin in presence or absence of antimony. H. Harris. December 4, 1922.

213,661. Purifying and hydrogenating heavy mineral oils, coal distillates, coal slimes or other heavy hydrocarbons and raw products obtained therefrom. Process of. Internationale Bergin Compagnie voor Olie en Kolen-Chemie and H. Horsass. January 2, 1923.

213,711. Alkali salts of higher fatty acids, Production of. W. Lund. January 22, 1923.

213,765. Cellulose, Treatment of—and the obtainment of an improved product. Courtaulds, Ltd., S. S. Napper and C. Diamond. March 29, 1923.

213,777. Filtering liquids, Apparatus for use in. W. Robson. April 16, 1923.

213,818. Water gas, Manufacture of. Humphreys and Glasgow, Ltd. (*O. B. Evans.*) July 3, 1923.

LATEST NOTIFICATIONS.

214,222. Apparatus and process for low-temperature distillation. Ramage, A. S. April 9, 1923.

214,237. Manufacture of complex metallic arseno-benzene compounds. Farbwerke vorm. Meister, Lucius, & Brüning. April 9, 1923.

214,242. Manufacture of artificial resins. Society of Chemica Industry in Basle. April 9, 1923.

214,261. Manufacture of 1-phenyl-2, 3-dimethyl-4-dimethylamino-5-pyrazolone. Lockemann, Dr. G. April 10, 1923.

Applications for Patents

Barnard, C. M. Manufacture of azo-dyestuffs. 9,703. April 16.

British Dyestuffs Corporation, Ltd., and Fyfe, A. W. Dyeing acetyl silk. 9,583. April 15.

Distillers Co., Ltd., and Meyer, E. A. Dehydrating alcohol. 9,704. April 16.

Ellenberger and Schrecker. Production of gelatine and glue from chrome leather, etc. 9,562. April 15. (Germany, January 28.)

Ewan, T. Manufacture of alkali metals. 9,621. April 16. (April 3, 1923.)

Ewan, T. Manufacture of alkali metals. 9,622. April 16. (December 8, 1923.)

Hemingway W. Manufacture of soap. 9,392. April 14.

Lomax, E. L., Lucas, O. D., and V. L. Oil Processes, Ltd. Production of the lower from the higher phenols. 9,786. April 17.

McDougall, I. Insecticides. 9,576. April 15.

Naugatuck Chemical Co. Process for treating rubber, etc. 9,554. April 15. (United States, June 25, 1923.)

Oesterreichische Chemische Werke Ges. Manufacture of persulphuric acid, etc. 9,604. April 15. (Austria, May 22, 1923.)

Picken, G. H. Centrifugal separators. 9,744. April 17.

Schobel, H., and Society of Chemical Industry in Basle. Manufacture of azo-dyestuffs. 9,713. April 16.

Society of Chemical Industry in Basle. Dyestuffs. 9,594. April 15. (Switzerland, April 19, 1923.)

Science and Labour

THE British Science Guild and the National Joint Council of the Trade Union Congress and the Labour Party are co-operating in organising a conference on Science and Labour at the British Empire Exhibition on May 30 and 31. A joint committee has been constituted, with Sir Richard Gregory as chairman, to make arrangements for the meetings, of which there will be five, and the subjects selected for discussion are "The Place of Science in Government," "Scientific Research in Relation to Industry," "Co-operation of Labour and Science in Production," "Science and the Human Factor," and "Science in Educational Organisation." The Prime Minister has consented to open the conference, and representatives both of Science and Labour will take part in the discussions.

International Cement Congress

THE International Cement Congress, which is held under the ægis of the Institution of Structural Engineers, opened at Olympia, London, on Tuesday, when sixty delegates were received by Major James Petrie, the President of the Institution of Structural Engineers. The delegates included those from the Institution of Chemical Engineers, the Chemical Society, the Faraday Society, and the National Physical Laboratory.

Among the papers read at the afternoon session of the congress was one by Colonel H. Vaughan Kent on "Concrete Block Construction," in which it was stated that concrete, as a material for the construction of dwelling houses, had got a bad name in the past owing to the fact that it was not properly understood, but now the faults had been eradicated. The British Empire Exhibition at Wembley ought to show the public what could be done with concrete from an architectural point of view.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers ; those interested in close variations in prices should study the market report.

London, April 24, 1924.

THERE is little of interest to report this week, markets having hardly recovered yet after the holiday interval.

There is practically no change in values, and export business seems a little brighter.

General Chemicals

ACETONE is inclined to be easier due to the small demand.

ACID ACETIC.—Price maintained.

ACID CITRIC.—Firm and in better request.

ACID FORMIC still maintains its strong position for near delivery.

ACID LACTIC is steady and in moderate demand.

ACID OXALIC.—Unchanged.

ACID TARTARIC.—Moderate active without change in value.

BARIUM CHLORIDE.—Inclined to be scarce and price very firm.

BLEACHING POWDER.—Home trade is moderately good, while export is inclined to be quiet.

CREAM OF TARTAR.—Firm and active.

FORMALDEHYDE is firm but only in small demand.

LEAD ACETATE continues scarce and firm both for near and future.

METHYL ALCOHOL is strong and in good request.

POTASSIUM CARBONATE AND CAUSTIC.—Unchanged.

POTASSIUM PERMANGANATE.—The decline seems to have been arrested but demand leaves a good deal to be desired.

POTASSIUM PRUSSIATE.—Only a small business is passing, price unchanged.

SODIUM ACETATE continues scarce and firm.

SODIUM BICHROMATE.—Unchanged.

SODIUM HYPOSULPHITE.—In moderate demand at British makers' figures.

SODIUM NITRATE continues scarce.

SODIUM PHOSPHATE.—Only a moderate business is reported.

SODIUM PRUSSIATE.—Unchanged.

SODIUM SULPHIDE has been in request on export account, while home trade is moderately good.

Coal Tar Intermediates

Business has fallen off somewhat during the past week as a result of the holidays, although the general tone of the market is steady with fair enquiry in one or two particular lines.

ALPHA NAPHTHOL continues to be of interest in both home and export markets.

ALPHA NAPHTHYLAMINE is quiet without change in value.

ANALINE OIL AND SALT are of interest chiefly on export account.

BENZIDINE BASE is unchanged.

BETA NAPHTHOL.—Some small business has been placed.

DIMETHYLANILINE is of interest for export, the price being unchanged.

DIPHENYLAMINE is quieter, without change in value.

" H " ACID continues to be of fair interest.

NITRO BENZOL.—A fair business is passing and the price is steady.

PARANITRANILINE.—Export inquiries have been received, while the home market is quieter.

" R " SALT is without special feature.

RESORCINE has been of less interest than of late.

XYLIDINE is unchanged.

Coal Tar Products

The market is quietly steady, and there is little change in values from last week. Many works are closed for most of this week, owing to the Easter holidays.

90% BENZOL is valued at about 1s. 6d. per gallon on rails.

PURE BENZOL is quoted at 1s. 11d. per gallon on rails.

CREOSOTE OIL is steady at 7½d. to 7¾d. per gallon on rails in the North, while in London the price is 8¼d. to 9d. per gallon.

CRESYLIC ACID is firm, the pale quality 97/99% being quoted at 2s. 1d. to 2s. 2d. per gallon on rails, while the dark quality 95/97% is worth from 1s. 9d. to 1s. 10d. per gallon.

SOLVENT NAPHTHA is firm at 1s. 3d. per gallon on rails.

HEAVY NAPHTHA is also firm at 1s. 2d. to 1s. 3d. per gallon on rails.

NAPHTHALENES are quiet, the low quality being worth from £6 to £7 per ton, 74/76 melting point £7 10s. to £8 per ton, and 76/78 melting point £8 10s. to £9 per ton.

PITCH is quiet and prices are unchanged.

Sulphate of Ammonia

The demand is satisfactory.

Pharmaceutical Chemicals

Owing to the holidays, there is no reported change in this market.

Chemical Trade Inquiries

The following inquiry, abstracted from the "Board of Trade Journal," has been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the name and address of the inquirer by applying to the Department (quoting the reference number and country).

SCIENTIFIC INSTRUMENTS, LABORATORY GLASSWARE, ETC.—A firm of manufacturers' agents in Melbourne, Australia, wishes to secure the representation of British manufactures of medicines, surgical and dental requisites, including electro-medical and electro-dental goods, laboratory glassware and scientific instruments, perfumery and oils, labelling, wrapping, filling machines, aniline and vegetable dyes, machinery and materials for tanners, woollen mills, chocolate manufacturers, soap works, manufacturing chemists, etc. Representation for the whole of Australia is desired. (Reference No. 448.)

DRUGS AND DRUGGISTS' SUNDRIES.—A firm of manufacturers' agents in Sydney, Australia, one of whose directors is on his way to this country, desires to undertake the representation of British manufacturers of drugs and druggists' sundries on a commission basis in Australia. The firm has branch offices in the chief towns of Australia. (Reference No. 449.)

ACETONE AND SULPHATE OF SODA FOR BELGIUM.—An agent, established in Forest-Brussels, is desirous of obtaining the representation, on a commission basis, of British firms for the sale in Belgium of manganese ore from British India, acetone, and sulphate of soda. (Reference No. 416.)

RAW MATERIALS FOR SOAP AND GLASS WORKS.—H.M. Consul at Liège reports that an important Belgian wholesale co-operative society, with numerous retail branches, is desirous of getting in touch with important British firms for the purchase of raw materials for distilleries, breweries and soap and glass works. (Reference D.O.T. 22606/F.W./G.C./2.)

RAW PHOSPHATES FOR CZECHOSLOVAKIA.—An agent in Prague desires to secure the representation of British exporters of raw phosphates. (Reference No. 420.)

Recent Wills

Mr. James Robertson Watson, of Muiryfauld Drive, Parkhead, Glasgow, sometime Professor of Chemistry in the Anderson College of Medicine, Glasgow £18,640

Mr. William Douglas Herman, of Holm Lea, Rainhill, Lancs, chemical engineer £10,276

Current Market Prices

General Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride, 90–95%	lb.	0	1	4	to	0	1	5
Acetone oil	ton	80	0	0	to	85	0	0
Acetone, pure	ton	102	10	0	to	105	0	0
Acid, Acetic, glacial, 99–100%	ton	73	0	0	to	74	0	0
Acetic, 80% pure	ton	48	10	0	to	49	0	0
Acetic, 40% pure	ton	25	0	0	to	25	10	0
Arsenic, liquid, 2000 s.g.	ton	85	0	0	to	88	0	0
Boric, commercial	ton	48	0	0	to	52	0	0
Carbolic, cryst. 39–40%	lb.	0	0	7½	to	0	0	8
Citric	lb.	0	1	5½	to	0	1	6
Formic, 85%	ton	63	0	0	to	64	0	0
Hydrofluoric	lb.	0	0	7	to	0	0	8
Lactic, 50 vol	ton	37	0	0	to	39	0	0
Lactic, 60 vol	ton	43	0	0	to	45	0	0
Nitric, 80 Tw	ton	23	0	0	to	25	0	0
Oxalic	lb.	0	0	5½	to	0	0	5½
Phosphoric, 1.5	ton	35	0	0	to	38	0	0
Pyrogallic, cryst	lb.	0	5	9	to	0	6	0
Salicylic, technical	lb.	0	1	9½	to	0	2	0
Sulphuric, 92–93%	ton	6	0	0	to	7	0	0
Tannic, commercial	lb.	0	2	0	to	0	2	3
Tartaric	lb.	0	1	1½	to	0	1	2
Alum, lump	ton	12	10	0	to	13	0	0
Chrome	ton	23	0	0	to	24	0	0
Alumino ferric	ton	7	0	0	to	7	5	0
Aluminium, sulphate, 14–15%	ton	7	10	0	to	8	10	0
Sulphate, 17–18%	ton	8	10	0	to	9	10	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
.880	ton	32	0	0	to	34	0	0
.920	ton	22	0	0	to	24	0	0
Carbonate	ton	30	0	0	to	32	0	0
Chloride	ton	50	0	0	to	55	0	0
Muriate (galvanisers)	ton	32	0	0	to	33	0	0
Nitrate (pure)	ton	40	0	0	to	45	0	0
Phosphate	ton	63	0	0	to	65	0	0
Sulphocyanide, commercial 90%	lb.	0	1	5	to	0	1	6
Amyl acetate, technical	ton	280	0	0	to	300	0	0
Arsenic, white powdered	ton	65	0	0	to	66	0	0
Barium, carbonate, Witherite	ton	5	0	0	to	6	0	0
Carbonate, Precip	ton	15	0	0	to	16	0	0
Chlorate	ton	65	0	0	to	70	0	0
Chloride	ton	14	0	0	to	14	10	0
Nitrate	ton	37	0	0	to	40	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	0	11	to	0	1	0
Bleaching powder, 35–37%	ton	10	0	0	to	10	10	0
Borax crystals, commercial	ton	25	0	0	to		—	
Calcium acetate, Brown	ton	13	0	0	to	14	0	0
Grey	ton	20	0	0	to	21	0	0
Carbide	ton	13	0	0	to	13	10	0
Chloride	ton	5	15	0	to	6	0	0
Carbon bisulphide	ton	35	0	0	to	40	0	0
Casein technical	ton	80	0	0	to	90	0	0
Cerium oxalate	lb.	0	3	0	to	0	3	6
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	1	to	0	1	2
Sulphate	ton	24	10	0	to	25	0	0
Cream Tartar, 98–100%	ton	80	0	0	to	85	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol	ton	65	0	0	to	66	0	0
Formusol (Rongalite)	lb.	0	1	11	to	0	2	0
Glauber salts commercial	ton	4	0	0	to	4	10	0
Glycerin crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols	gal	0	2	0	to	0	2	1
Iron perchloride	ton	20	0	0	to	22	0	0
Sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	49	10	0	to	50	0	0
Carbonate (White Lead)	ton	50	0	0	to	52	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	50	0	0	to	51	0	0
Lithophone, 30%	ton	22	10	0	to	23	0	0
Magnesium chloride	ton	4	0	0	to	4	5	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	5	15	0	to	6	0	0
Sulphate (Druggists')	ton	9	0	0	to	10	0	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	45	0	0	to	48	0	0
Methyl acetone	ton	82	0	0	to	85	0	0
Alcohol, 1% acetone	ton	85	0	0	to	86	0	0
Nickel sulphate, single salt	ton	37	0	0	to	38	0	0
Ammonium sulphate, double salt	ton	37	0	0	to	38	0	0
Potash, Caustic	ton	32	0	0	to	33	0	0
Potassium bichromate	lb.	0	0	5½	to		—	
Carbonate, 90%	ton	30	0	0	to	31	0	0
Chloride, 80%	ton	9	0	0	to	10	0	0
Chlorate	lb.	0	0	3½	to		—	
Metabisulphite, 50–52%	ton	63	0	0	to	65	0	0
Nitrate, refined	ton	38	0	0	to	40	0	0
Permanganate	lb.	0	0	8	to	0	0	8½
Prussiate, red	lb.	0	1	10	to	0	2	0
Prussiate, yellow	lb.	0	0	8½	to	0	0	9
Sulphate, 90%	ton	10	0	0	to	10	10	0
Salammoniac, firsts	cwt.	2	15	0	to		—	
Seconds	cwt.	2	17	6	to		—	
Sodium acetate	ton	25	0	0	to	25	10	0
Arsenate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to		—	
Bisulphite, 60–62%	ton	20	0	0	to	22	0	0
Chlorate	lb.	0	0	2½	to	0	0	3
Caustic, 70%	ton	17	10	0	to	18	0	0
Caustic, 76%	ton	18	10	0	to	19	0	0
Hydrosulphite, powder	lb.	0	1	6	to	0	1	7
Hyposulphite, commercial	ton	10	0	0	to	10	10	0
Nitrite, 96–98%	ton	29	0	0	to	30	0	0
Phosphate, crystal	ton	15	10	0	to	16	0	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	5½	to	0	0	6
Sulphide, crystals	ton	8	10	0	to	9	0	0
Sulphide, solid, 60–62%	ton	15	0	0	to	16	10	0
Sulphite, cryst	ton	11	10	0	to	12	0	0
Strontium carbonate	ton	50	0	0	to	55	0	0
Nitrate	ton	50	0	0	to	55	0	0
Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Flowers	ton	11	0	0	to	11	10	0
Roll	ton	9	15	0	to	10	10	0
Tartar emetic	lb.	0	1	0	to	0	1	1
Tin perchloride, 33%	lb.	0	1	4	to	0	1	5
Perchloride, solid	lb.	0	1	5	to	0	1	6
Protochloride (tin crystals)	lb.	0	1	8	to	0	1	10
Zinc chloride 102° Tw	ton	20	0	0	to	21	0	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	42	0	0	to	45	0	0
Dust, 90%	ton	50	0	0	to	55	0	0
Sulphate	ton	15	0	0	to	16	0	0

Pharmaceutical Chemicals

Acetyl salicylic acid	lb.	0	3	6	to	0	3	10
Acetanilid	lb.	0	2	6	to	0	2	9
Acid, Gallic, pure	lb.	0	3	0	to	0	3	3
Lactic, 1.21	lb.	0	2	9	to	0	3	0
Salicylic, B.P.	lb.	0	1	10	to	0	2	0
Tannic, leviss	lb.	0	3	0	to	0	3	3
Amidol	lb.	0	8	6	to	0	9	0
Amidopyrin	lb.	0	13	6	to	0	14	0
Ammon ichthosulphonate	lb.	0	1	10	to	0	2	0
Barbitone	lb.	0	16	0	to	0	16	6
Beta naphthol resublimed	lb.	0	3	6	to	0	4	0
Bromide of ammonia	lb.	0	0	10½	to	0	1	1
Potash	lb.	0	0	8	to	0	0	8
Soda	lb.	0	0	8½	to	0	0	9
Caffeine, pure	lb.	0	12	0	to	0	12	6
Calcium glycerophosphate	lb.	0	5	9	to	0	6	0
Lactate	lb.	0	1	6	to	0	1	9
Calomel	lb.	0	4	0	to	0	4	3
Chloral hydrate	lb.	0	3	10	to	0	4	0
Cocaine alkaloid	oz.	1	1	0	to	1	2	6
Hydrochloride	oz.	0	17	0	to	0	17	6
Corrosive sublimate	lb.	0	3	5	to	0	3	7
Eucalyptus oil, B.P. (70–75% eucalyptol)	lb.	0	2	0	to	0	2	2
B.P. (75–80% eucalyptol)	lb.	0	2	1	to	0	2	3
Guaiacol carbonate	lb.	0	12	9	to	0	13	0
Liquid	lb.	0	11	6	to	0	12	0
Pure crystals	lb.	0	12	6	to	0	13	0
Hexamine	lb.	0	3	9	to	0	4	0
Hydroquinone	lb.	0	4	6	to	0	5	0
Lanoline anhydrous	lb.	0	0	7	to	0	0	6
Lecithin ex ovo	lb.	1	5	0	to	1	7	6
Lithi carbonate	lb.	0	9	6	to	0	10	0
Methyl salicylate	lb.	0	2	9	to	0	3	0
Metol	lb.	0	10	6	to	0	11	6
Milk sugar	cwt.	4	0	0	to	4	5	0
Paraldehyde	lb.	0	1	5	to	0	1	7
Phenacetin	lb.	0	6	9	to	0	7	0
Phenazone	lb.	0	7	9	to	0	8	3
Phenolphthalein	lb.	0	7	3	to	0	7	6
Potassium sulpho guaiacolate	lb.	0	6	3	to	0	6	9
Quinine sulphate, B.P.	oz.	0	2	3	to		—	

	Per	£	s.	d.		£	s.	d.
Resorcin, medicinal	lb.	0	5	6	to	0	6	0
Salicylate of soda powder	lb.	0	2	6	to	0	2	9
Crystals	lb.	0	2	9	to	0	3	0
Salol	lb.	0	4	0	to	0	4	3
Soda Benzoate	lb.	0	3	0	to	0	3	3
Sulphonal	lb.	0	17	6	to	0	18	3
Terpene hydrate	lb.	0	1	9	to	0	2	0
Theobromine, pure	lb.	0	12	0	to	0	12	3
Soda salicylate	lb.	0	8	6	to	0	9	0
Vanillin	lb.	1	5	0	to	1	7	6

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	1	9	to	0	2	0
Refined	lb.	0	2	3	to	0	2	6
Alphanaphthylamine	lb.	0	1	6½	to	0	1	7
Aniline oil, drums extra	lb.	0	0	8½	to	0	0	8¾
Salts	lb.	0	0	9	to	0	0	9½
Anthracene, 40–50%	unit	0	0	8¼	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	2	9	to	0	3	0
Benzidine, base	lb.	0	4	4	to	0	4	7
Sulphate	lb.	0	3	4	to	0	3	7
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol	lb.	0	1	1	to	0	1	2
Betanaphthylamine, technical	lb.	0	4	0	to	0	4	3
Crocesine Acid, 100% basis	lb.	0	3	3	to	0	3	6
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	4	6	to	0	4	9
Dinitrobenzol	lb.	0	1	1	to	0	1	2
Dinitrochlorbenzol	lb.	0	0	10	to	0	0	11
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	3	to	0	1	4
Dinitrophenol	lb.	0	1	6	to	0	1	7
Dimethylaniline	lb.	0	2	8	to	0	2	10
Diphenylamine	lb.	0	3	0	to	0	3	3
H-Acid	lb.	0	4	3	to	0	4	6
Metaphenylenediamine	lb.	0	4	0	to	0	4	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	5	9	to	0	6	0
Metatoluylenediamine	lb.	0	4	0	to	0	4	3
Monosulphonic Acid (2.7)	lb.	0	8	6	to	0	9	6
Naphthionic acid, crude	lb.	0	2	4	to	0	2	6
Naphthionate of Soda	lb.	0	2	4	to	0	2	6
Naphthylamine-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	3	to	0	7	9
Nitrobenzol	lb.	0	0	7	to	0	0	8
Nitronaphthalene	lb.	0	0	11½	to	0	1	0
Nitrotoluol	lb.	0	0	8	to	0	0	9
Orthoamidophenol base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	0	10	to	0	0	11
Orthonitrotoluol	lb.	0	0	3	to	0	0	4
Para-amidophenol, base	lb.	0	8	6	to	0	9	0
Hydrochlor	lb.	0	7	6	to	0	8	0
Paradichlorbenzol	lb.	0	0	9	to	0	0	10
Paranitraniline	lb.	0	2	6	to	0	2	8
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	2	9	to	0	3	0
Paraphenylenediamine, distilled	lb.	0	12	0	to	0	12	6
Paratoluidine	lb.	0	5	6	to	0	5	9
Phthalic anhydride	lb.	0	2	6	to	0	2	9
Resorcin, technical	lb.	0	4	0	to	0	4	3
Sulphanilic acid, crude	lb.	0	0	9	to	0	0	10
Toluidine, base	lb.	0	7	3	to	0	7	9
Mixture	lb.	0	2	6	to	0	2	9

Essential Oils and Synthetics

Essential Oils.		£	s.	d.
Anise	c.i.f. 2/6 spot	0	2	8
Bay		0	10	6
Bergamot	dearer	0	18	0
Cajuput		0	3	3
Camphor, white	per cwt.	3	15	0
Brown	„	3	15	0
Cassia	c.i.f. 7/6, spot	0	8	3
Cedarwood		0	1	6
Citronella (Ceylon)	c.i.f. 3/3, spot	0	3	6
(Java)	very firm, c.i.f. 4/6, spot	0	4	9
Clove		0	8	6
Eucalyptus		0	2	2
Geranium Bourbon		1	13	0
Lavender		1	5	0
Lavender Spike		0	6	0
Lemon		0	3	6
Lemongrass	per oz.	0	0	2½
Lime (distilled)	firm	0	5	0
Orange sweet (Sicilian)		0	12	9
(West Indian)		0	9	6
Palmarosa		0	18	0
Peppermint (American)	dearer	1	1	0

		£	s.	d.
Mint (dementholised Japanese)		0	18	0
Patchouli		1	2	6
Otto of Rose	per oz.	1	15	0
Rosemary		0	1	9
Sandalwood		1	5	0
Sassafras		0	10	6
Thyme	2/6 to	0	8	0

Synthetics.				
Benzyl acetate	per lb.	0	3	6
Benzoate	„	0	3	6
Citral	„	0	10	0
Coumarine	„	1	0	0
Heliotropine	„	0	8	0
Ionone	„	1	5	0
Linalyl acetate	dearer „	1	10	0
Methyl salicylate	„	0	2	6
Musk xylol	„	1	0	0
Terpeniol	„	0	2	9

Death from Pitch Cancer

An inquest was held at Manchester on Wednesday by the City Coroner (Mr. C. W. W. Surridge) on an employée, aged 50, at the tar distillation works of Messrs. J. E. C. Lord, Weaste, Manchester, who died in hospital on April 16. Mr. E. Bayley, works manager, who gave evidence, said the deceased had been employed by Messrs. Lord for varying periods during the last twenty years, his chief work being to break up pitch and load it up into wagons. In March of this year he was certified to be suffering from a cancerous growth due to the handling of pitch. In reply to Mr. W. H. Seal, H.M. Inspector of Factories, witness explained that the pitch was broken up in the open air. A certain amount of dust was caused in the breaking process and workers might inhale it. No part of his work, however, brought the disease into contact with the fumes arising from the molten pitch.

Dr. Fay stated that deceased was admitted into the Crumpsall Institution on February 25 last suffering from advanced cancerous disease, and that his (witness's) diagnosis was confirmed by microscopical examination. He considered that the disease might have arisen from the man's long association with pitch and that had it been treated in its early stages it might have been cured. There was a good prospect of cure then, but none when the glands were involved. In reply to the coroner, who said he was anxious to know whether a cure was possible if the disease was detected in its earliest stages as a result of periodical examination of the men being made obligatory upon employers, Dr. Fay said such examination would be invaluable, as doctors would then have a reasonable chance of doing something. As a rule they only received such cases when they were in a hopeless condition.

On behalf of the firm it was stated that they were prepared to have such periodical examinations of their employees. The Coroner stated that he was satisfied that the man's death was due to the nature of his employment and a verdict to that effect was returned.

Removal of Impurities from Coal

Members of the Society of Chemical Industry (Newcastle Section) and the Coke Oven Managers' Association (Northern Section) visited the Teams By-Product Co.'s Works at Dunston, on Wednesday, April 16. They were shown round by Mr. A. W. Reichwald (general manager), Mr. J. B. Curry (coke plant manager), Mr. W. Campion (works manager), and Mr. H. Smith (chief chemist). The visitors saw the method of work at the coke ovens, and the recovery of tar, sulphate of ammonia, naphthalene, and other products, and also work at the tar distillation plant.

In the evening a joint meeting of the two societies was held in the Chemical Lecture Theatre, Armstrong College, Newcastle, when a paper prepared by Messrs. J. G. Scoular and Basil Dunglinson, on the subject of "Coal Washing at Oughterside," was read. The lecture was the more interesting by reason of the fact that members had seen a similar process in operation at the Teams By-Product Works during the afternoon. The paper said that the froth flotation washer was certainly an effective means of separating fine coal from impurity. The machine was compact and needed little attention. The main value from a coke manufacturer's point of view was that it was a means of cleaning fine coal, coal which had to be washed fine to free impurity, and refuse from a jig washer after crushing.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, April 24, 1924.

WITH the intervention of the holidays, business has been practically at a standstill during the past week, and there is consequently nothing of importance to record.

Prices at time of writing are on about the same level as a week ago.

Industrial Chemicals

ACID ACETIC.—Prices remain unchanged. Glacial, 98/100% £62 to £70 per ton; 80% pure, £50 to £53 per ton; 80% technical, £47 to £50 per ton. All packed in casks delivered c.i.f. U.K. port, duty free.

ACID BORACIC.—Crystals or granulated, £48 per ton; powdered, £50 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC, ICE CRYSTALS.—Rather better inquiry. Quoted 8d. per lb., carriage paid.

ACID CITRIC, B.P. CRYSTALS.—Remain unchanged at about 1s. 6d. per lb., less 5%, carriage paid. Quoted 1s. 5¾d. per lb., less 5% c.i.f. U.K. port, prompt shipment.

ACID FORMIC 85%.—Spot parcels unchanged at about £63 per ton, ex store. Offered from the Continent at about £61 15s. per ton, c.i.f. U.K. port.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80°.—£23 10s. per ton, ex station, full truck loads.

ACID OXALIC.—Quoted 5½d. per lb., ex store. Offered from the Continent at 5d. per lb., c.i.f. U.K. port, prompt shipment.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Moderate inquiry. Spot material quoted 1s. 1¼d. per lb., less 5% ex store.

ALUMINA, SULPHATE, 17/18%, Iron free.—Quoted £8 2s. 6d. per ton ex store, spot delivery.

ALUM, CHROME.—Ammonium chrome alum quoted £19 to £21 per ton, according to quality, f.o.b. U.K. port. Potash chrome alum about £26 per ton, ex store or station.

ALUM, POTASH (LUMP).—Quoted £10 15s. per ton, ex store, spot delivery. Crystal potash alum quoted £8 12s. 6d. per ton, ex wharf, prompt shipment from the Continent.

AMMONIA, ANHYDROUS.—Unchanged at about 1s. 5½d. per lb., ex station, prompt delivery.

AMMONIA, CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered U.K.

AMMONIA, LIQUID 880°.—Unchanged at 2½d. to 3d. per lb., delivered, according to quantity. Containers extra.

AMMONIA, MURIATE.—Grey Galvanisers quality on offer at £30 per ton, ex station, or delivered f.o.b. U.K. port. Fine white crystals offered from the Continent at about £25 15s. per ton, c.i.f. U.K. port.

AMMONIA, SULPHATE.—25¼%, £13 12s. per ton, 25¾% quality, £14 15s. per ton, ex works, prompt delivery.

ARSENIC, WHITE POWDERED.—In little demand. Spot lots on offer at about £64 to £65 per ton, ex wharf.

BARIUM, CHLORIDE, 98/100%.—English make about £14 to £14 5s. per ton, ex store. On offer from the Continent at £13 5s. per ton, c.i.f. U.K. ports.

BARYTES.—Finest English white quoted £5 5s. per ton, ex works. Continental about £5 per ton, c.i.f. U.K. port.

BLEACHING POWDER.—Spot lots £11 per ton, ex station. Contracts 20s. per ton less.

BORAX.—Granulated, £24 10s. per ton; crystal, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s.6d per ton, ex station. Continental inclined to be dearer at about £4 12s. 6d. per ton, c.i.f. U.K. port.

COPPERAS, GREEN.—Unchanged at about £2 5s. per ton, f.o.b. U.K. port in bulk. Quoted £3 5s. to £3 10s. per ton, in casks.

COPPER, SULPHATE.—Unchanged at about £25 per ton, ex store. Spot lots of Continental material on offer at slightly less.

FORMALDEHYDE, 40%.—Spot material quoted £63 per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental on offer at £3 3s. 6d. per ton, c.i.f. U.K. port.

LEAD, RED.—Spot lots of Continental material nominally £41 per ton, ex store, but could probably be obtained for less.

LEAD, WHITE.—Unchanged at about £42 per ton, ex store, spot delivery.

LEAD ACETATE.—White crystals now quoted £47 to £47 5s. per ton, ex store; brown, about £1 per ton less; white crystals offered from the Continent at about £45 17s. 6d. per ton, c.i.f. U.K. port.

MAGNESITE, CALCINED.—English ground material offered at £8 per ton, ex station. Moderate inquiry for export.

MAGNESIUM, CHLORIDE.—Spot material now quoted £3 17s. 6d. per ton, ex store. Offered from the Continent at £3 7s. 6d. per ton, c.i.f. U.K. port.

MAGNESIUM SULPHATE (EPSOM SALTS).—Commercial quality quoted £5 per ton, ex store. B.P. £6 5s. per ton, ex station, prompt delivery.

POTASH, CAUSTIC 88/92%.—Spot lots quoted £32 10s. per ton, ex store. Offered from the Continent at about £31 per ton, ex wharf.

POTASSIUM BICHROMATE.—Unchanged at 5¾d. per lb., delivered.

POTASSIUM CARBONATE 96/98%.—Quoted £24 per ton, c.i.f. U.K. port. Spot lots about £27 per ton, ex store. 90/94% quality about £23 per ton, c.i.f. U.K. port.

POTASSIUM CHLORATE.—Little inquiry. Offered at 3½d. per lb., ex store, spot delivery.

POTASSIUM NITRATE (SALTPETRE).—Quoted £27 15s. per ton, c.i.f. U.K. port. Spot lots unchanged at about £31 per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Unchanged at 9d. per lb., ex store, spot delivery.

POTASSIUM PRUSSIATE (YELLOW).—Quoted 8¼d. to 8¾d. per lb., f.o.b. U.K. port or ex station.

SODA CAUSTIC.—76/77%, £19 7s. 6d. per ton; 70/72%, £17 17s. per ton; 60/62%, broken, £19 2s. 6d. per ton; 98/99% powdered, £22 15s. per ton. All ex station, spot delivery, contracts 20s. per ton less.

SODIUM ACETATE.—Quoted £25 5s. per ton, ex store. Offered for early delivery at £23 10s. per ton, c.i.f. U.K. port.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—English makers' price unchanged at 4½d. per lb., D/d.

SODIUM CARBONATE.—(Soda crystals) £5 to £5 5s. per ton, ex quay or station. Alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOPHOSPHITE.—English material quoted at £10 per ton, ex station. Continental on offer at slightly less. Pea crystals of English manufacture quoted £14 10s. per ton, ex station.

SODIUM NITRATE.—Refined 96/98% quality unchanged at £13 10s. to £13 15s. per ton, f.o.r. or f.o.b. U.K. port.

SODIUM NITRITE 100%.—Moderate inquiry. Price about £28 per ton, f.o.b. U.K. port.

SODIUM PRUSSIATE (YELLOW).—Unchanged at about 5d. per lb., ex store. Continental material on offer at 4¾d. per lb., c.i.f. U.K. port.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption, £4 5s. per ton, carriage paid stations. Good export inquiry.

SODIUM SULPHIDE 60/65% SOLID.—English make, £14 15s. per ton, ex station; broken, £1 per ton more; flake, £2 per ton more; 60/62% solid offered from the Continent at £12 16s. 6d. per ton, c.i.f. U.K. port; broken, £1 per

ton more; 31/34% crystals, English make, £9 2s. 6d. per ton, ex station; 30/32% crystals, Continental make, £8 17s. 6d. per ton, c.i.f. U.K. port.

SULPHUR.—Flowers, £10 per ton; Roll, £9 per ton; Rock, £9 per ton; Ground, £8 per ton. Prices nominal.

ZINC CHLORIDE 98/100%.—Quoted £26 10s. per ton, f.o.b. U.K. port.

ZINC SULPHATE.—English material about £13 10s. per ton, ex store. Offered from the Continent at £11 7s. 6d. per ton, c.i.f. U.K. port.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHYLAMINE.—Good inquiries. Price firm at 1s. 5d. lb., delivered.

ANILINE OIL.—Good export inquiries. Price, 9d. lb., f.o.b., drums included.

BENZALDEHYDE.—Some home inquiry. Price, 2s. 3½d. lb., delivered.

BENZIDINE BASE.—Export inquiry. Price, 4s. 6d. lb., 100% basis.

BETA NAPHTHOL.—Export inquiry. Price firm at 1s. 1d. lb., delivered.

CHROMOTROPE ACID.—Price, 8s. lb., 100% basis, f.o.b.

CROCEINE ACID.—Some export inquiry. Price, 2s. 7d. lb., 100% basis.

CLEVE ACID.—Export inquiry. Price, 3s. 4d. lb., 100% basis, f.o.b.

DIPHENYLAMINE.—Price, 3s. 1d. per lb., f.o.b.

ETHYL BENZYL ANILINE.—Some export inquiry. Price, 6s. 1d. lb., drums included.

GAMMA ACID.—Good export demand. Price, 11s. lb., 100% basis, f.o.b.

H. ACID.—Some export inquiry. Price, 4s. 4d. lb., 100% basis, f.o.b.

J. ACID.—Export inquiry. Price, 12s. 9d. lb., 100% basis, f.o.b.

META PHENYLENEDIAMINE.—Export inquiry. Price, 4s. 6d. per lb.

META TOLUYLENEDIAMINE.—Export inquiry. Price, 4s. 6d. lb., f.o.b.

N.W. ACID.—Export inquiry. Price, 5s. 8d. lb., 100% basis, f.o.b.

SULPHANILIC ACID.—Export inquiry. Price, 10½d. lb., 100% basis, f.o.b.

Tariff Changes

FRANCE.—The export duty of 25 per cent. *ad valorem* has been removed in the case of copper sulphate.

TURKEY.—In view of the proposal to prohibit the import of artificial silk, attention is drawn to the fact that a Law of March 6 prohibits the manufacture, for purposes of trade, of fabrics (other than carpets) wholly or partly of artificial silk. This prohibition does not affect the import of such fabrics, but the Law requires a declaration showing the quantity and value of imported goods to be presented within twenty-four hours of Customs clearance to the local Chamber of Commerce or Municipality. A special permit is then issued by the Chamber, for which a fee of 1 per cent. of the invoice value of the goods will be charged.

Exports to Portugal and S. America

THE British Chemical and Dyestuffs Traders' Association announce that the Portuguese Government has issued a decree instructing their Consuls to charge a 4 per cent. *ad valorem* duty as a consular certificate fee in respect of exports to Portugal. The fee for such certificates in respect of all other European countries is a nominal one. All the South American States have a similar consular certificate fee in operation ranging from 2 to 5 per cent. Each State has a different schedule of charges which varies according to the class or nature of the goods. The association are in a position to furnish members with definite information as to the position of any article going to a particular State.

The Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, April 24, 1924.

THE Easter stoppage of business has served to throw things out of gear a little, and since the resumption on Tuesday conditions on the chemical market, as far as actual business is concerned, has been quieter if anything than they were before. Traders here, however, are hopefully inclined, and some of them report a fair number of fresh inquiries. The slight improvement in the position of the cotton industry, if continued, may before long prove helpful to the chemical trade. Prices have been steady on the whole, and no fluctuations of importance have to be reported.

Heavy Chemicals

Prussiate of soda is only in moderate demand, but no further change in value has occurred, 4¾d. to 5d. per lb. being quoted. Sulphide of sodium is fairly steady at £14 15s. for 60–65 per cent. concentrated solid, and £9 5s. to £9 10s. per ton for crystals, inquiry continuing on quiet lines. The demand for Glauber salts is still restricted, and prices for this material are rather weak at £3 10s. per ton. Alkali is unchanged at £6 15s. per ton for 58 per cent. quality to home consumers; a fair volume of business is being done for the home trade and for export. Caustic soda keeps steady at from £16 17s. 6d. for 60 per cent. to £19 7s. 6d. for 76–77 per cent. strength, and meets with a quietly steady demand for domestic consumption and for shipment. Chlorate of soda is being taken up only in comparatively small quantities; to-day's value is easy at 2¾d. per lb. Saltcake is rather quiet, but without change in value at round £4 10s. per ton. Hyposulphite of soda is inactive, and though unchanged from last week prices are on the weak side at £14 15s. for photographic crystals and £9 10s. to £9 15s. for commercial. Bicarbonate of soda is on offer at £10 10s. per ton; buying interest in this case is also rather small. Nitrite of soda is quiet but fully maintained at £28 to £28 10s. per ton. Bleaching powder is without change either in position or value at £10 per ton. Acetate of soda is attracting only a moderate amount of attention, though prices are maintained at £24 per ton. Phosphate of soda is dull and quotations continue to be easy at £13 10s. per ton. Soda crystals are steady and in fair inquiry at £5 5s. per ton. Bichromate of soda is attracting a moderate amount of attention at 4½d. per lb.

Caustic potash and carbonate of potash are rather easy though unchanged since last report, and a quietly steady demand is being met with. Caustic is on offer at £29 per ton for 90 per cent. and carbonate at £24 10s. Yellow prussiate of potash is selling slowly, but quotations are steadier at 8¼d. to 8½d. per lb. Permanganate of potash is dull at 7¼d. to 8¼d. per lb. according to quality. Bichromate of potash is maintained at 5¾d. per lb., and continues in moderate demand. Chlorate of potash is still quoted at 2¾d. to 3d. per lb., but fails to find a ready market.

White powdered arsenic, Cornish make, is easy at £62 per ton, Manchester, and little business of importance is offering. Sulphate of copper is steadier at £24 10s. per ton f.o.b., a slight improvement in the position of this material being reported. Grey acetate of lime is slightly cheaper at £19 10s. per ton; brown, however, keeps very firm at £15, supplies still being on the short side. Acetate of lead is now quoted at about £50 per ton for white and £47 for brown. Nitrate of lead is quiet but steady at £45 to £46 per ton. Commercial Epsom salts are unchanged at £4 10s. per ton for British makes; magnesium sulphate, B.P. quality, is quoted at £6 10s.

Acids and Tar Products

Both tartaric and citric acids are quiet, the former at 1s. 1¼d. and citric at 1s. 5d. to 1s. 5¼d. per lb. Acetic acid keeps steady and meets with a moderate inquiry at £47 per ton for 80 per cent. technical, and £70 for glacial. Oxalic acid is inactive at 5¼d. per lb.

The coal-tar products, on the whole, are devoid of interest. Carbolic acid crystals are quoted at 8¼d. to 8½d. per lb. and crude at 2s. 3d. per gallon. Pitch is still offering at £3 per ton, Manchester, and actual business is of small dimensions. Naphthalenes are about unchanged at £16 to £17 per ton for refined and £7 and upwards for crude. Solvent naphtha is firm and in fair demand at 1s. 5d. to 1s. 6d. per gallon. Creosote oil is inactive at about 8d. per gallon.

Company News

BRYANT AND MAY, LTD.—The transfer books of the company are closed until May 9.

THE NITRATE RAILWAYS CO., LTD.—The ordinary general meeting of the company will be held at Winchester House, Old Broad Street, London, on Tuesday, May 6, at 11 a.m.

THE INTERNATIONAL NICKEL CO.—A quarterly dividend of 1½ per cent. on the preferred stock has been declared payable on May 1 to the preferred stockholders of record at the close of business on April 17.

BABCOCK AND WILCOX, LTD.—A final dividend for the year 1923 is announced at the rate of 5 per cent. plus a bonus of 2 per cent., both tax free, making a total distribution of 12 per cent. for the year.

PARKE'S DRUG STORES.—The profit for the year to February 29 last including £428 brought in, and after allowing for repairs and renewals, was £8,711. A final dividend of 5 per cent. is recommended, making 7½ per cent. for the year, carrying forward £1,234.

ARIZONA COPPER CO.—The directors recommend a dividend for the year to March 31, of 2s. per share, free of tax, on the ordinary shares, of which 1s. per share, free of tax, was paid on November 1 last, and the balance of 1s. per share will be paid on May 31 to holders registered on May 10.

SALAR DEL CARMEN NITRATE SYNDICATE, LTD.—The directors recommend the payment of a final dividend of 25 per cent., less tax, in respect of the year ended December 31 last, making a total distribution for the year of 30 per cent., to transfer £20,000 to reserve, and to apply £7,039 to depreciation, leaving £16,494 to be carried forward.

THARSIS SULPHUR AND COPPER CO.—Mr. W. P. Rutherford, who presided at the annual meeting on April 16, said that their two big mines at Tharsis were closed down. The reason was simply the restricted market for pyrites. All the ore that the company could dispose of under existing circumstances could be supplied from Calanas mine and the cementation heaps, and it was obviously more economical to concentrate the work at one centre than to spread it over their various mines. The world market for pyrites still required to expand considerably before reaching its pre-war proportions, but it continued to increase steadily. During the year they purchased the entire properties of the Chemical Salt Co., Ltd., at Carrickfergus, Northern Ireland, including the lease of their salt mine there, and by this means had ensured a regular supply of salt for this company's extraction works.

Voluntary Liquidation of Disinfectant Manufacturers

IN pursuance of the provisions of the Companies (Consolidation) Act, 1908, a meeting of the creditors of Britex Chemical Products, Ltd., 26–29, Audrey House, Ely Place, London, E.C., and Britannia Street, City Road, London, N., manufacturers of disinfectants, in voluntary liquidation, was held recently at the registered offices of the company. The shareholders had previously passed a resolution to the effect that the company could not, by reason of its liabilities, continue its business, and that it was advisable to wind up the concern voluntarily. The shareholders also appointed Mr. D. Haslett, the secretary of the company, to act as the liquidator. According to the statement of affairs presented, the liabilities amounted to £5,503 4s. 3d. of which £3,112 5s. 9d. was due to unsecured trade creditors, and £2,390 18s. 6d. to cash creditors. The assets totalled £2,679 8s. 3d., or a deficiency of £2,823 16s. The company was incorporated in June, 1922, with a nominal capital of £14,000, which amount was later increased to £25,000. 18,000 shares were subscribed for cash and 2,000 were issued in consideration other than cash. In answer to a question as to who the shareholders were, the liquidator said they were for the most part directors. The company had lost a great deal of money in advertising, and it was very largely due to this and to the fact that the company had no liquid capital that they had been forced to go into voluntary liquidation. There was no doubt, however, continued Mr. Haslett that the Britex disinfectant was becoming very well known.

After some further discussion it was decided to leave the matter in the hands of the present liquidator.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, patent and trade mark agent, 51 and 52, Chancery Lane, W.C.2, from whom further information may be obtained. Opposition to the registration of the following trade marks can be lodged up to May 23, 1924.

"PHOTOPHOR"

445,439. For chemical substances used in photography. British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester; manufacturers of dyes and chemicals. February 15, 1924.

"BRIDYCOR"

445,440. For chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester; dyestuffs and chemical manufacturers. February 15, 1924. (To be associated, Section 24.)

"SOLOCHROME"

445,442. For chemical substances used in dyeing. Class 1. British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester; dyestuffs manufacturers. February 15, 1924.

"BETANONE"

445,963. For chemical substances used in manufactures or philosophical research, and anti-corrosives, but not including photographic chemicals, and not including any goods of a like kind to photographic chemicals. A. Boake, Roberts and Co., Ltd., 100, Carpenter's Road, Stratford, London, E.15; manufacturing chemists. March 4, 1924.

"MADERINAS"

446,455. For varnishes, enamels, paints, dry colours, distempers, japans, lacquers, and anti-corrosive oils. Class 1. The London Varnish and Enamel Co., Ltd., City Works, Carpenter's Road, Stratford, London, E.15; varnish and japan manufacturers. March 18, 1924.

"PESCARINE"

446,521. For paints, enamels, varnishes, dry colours, distempers, japans, lacquers, and anti-corrosive oils. Class 1. The International Paint and Compositions Co., Ltd., 6, Broad Street Place, London, E.C.2; manufacturers and general merchants. March 19, 1924.

"PRESUCOL"

446,168. For chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. Kolnrottweil Aktiengesellschaft (a Joint Stock company organised and existing under the laws of Germany), 8, Hindersinstrasse, Berlin, N.W.40, Germany; manufacturers. March 11, 1924.

"BRIDYCOR"

445,441. For chemical substances prepared for use in medicine and pharmacy. British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester; dyestuff and chemical manufacturers. February 15, 1924. (To be associated, Section 24.)

"VENECIN"

446,009. For chemical substances prepared for use in medicine and pharmacy. Venecin Aktiengesellschaft für Chemische Produkte (a Joint Stock company organised under the laws of Germany), 216, Kurfurstendamm, Berlin, W., Germany; manufacturers. March 5, 1924.

Contracts Open

Tenders are invited for the following articles. The latest dates for receiving tenders are, when available, given in parentheses:

COPENHAGEN (May 31).—Ammonia plant. Specification may be obtained from J. F. Edelberg, chief gas engineer, Vognmagergade, 8, Copenhagen.

RICHMOND (May 13).—Grey lime, Buxton lime and filter press cloth. Further particulars from Mr. W. Fairley, West Hall Road, Kew Gardens, Surrey.

RIGA (April 28).—The Latvian Railway Administration is calling for tenders for the supply of 50 tons of kerosene. Further particulars from the Department of Overseas Trade, 35, Old Queen Street, London. Reference No. 9085/FR./CC/2.

GLASGOW (May 10).—Coke-handling plant and transporting plant for vertical retorts at Dawsholm gasworks. Copies of drawings, etc., from the General Manager, Gas Department, 30, John Street, Glasgow.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

CASSELL, Hedley, Elm Tree Avenue, West Bridgford, patent medicine manufacturer. (C.C., 26/4/24.) £47 8s. 9d. March 12, and £23 17s. 7d. March 12.

DAVIES, William Everard, 13, Belsize Avenue, Hampstead, chemical engineer. (C.C., 26/4/24.) £16 14s. 5d. March 7.

WATERHOUSE AND GRAY, LTD., Stanley Chemical Works, Stanley, Sheffield, manufacturing chemists. (C.C., 26/4/24.) £22 1s. 9d. March 10.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

CLEMENT AND JOHNSON, LTD., London, W.C., chemists. (M., 26/4/24.) Registered April 11, £200, £200, £100, £200, £100, £100, £100, £100, £200, £100 and £100 debentures, part of £60,000; general charge. *£57,100 first debentures. January 31, 1924.

CROCKATT (JOHN), LTD., Leeds, dyers. (M., 26/4/24.) Registered April 7, £600 and any further advances, mortgage to Building Society; charged on 31, Huntriss Row, Scarborough. *£10,000. March 12, 1924.

DIVE (E. B.) AND CO., LTD., London, E., manufacturing chemists. (M., 26/4/24.) Registered April 1, mortgage to Bank; charged on 46, Old Gravel Lane and premises in Meeting House Alley, Wapping. *Nil. January 2, 1924.

HOLDEN (ARTHUR) AND SONS, LTD., Birmingham, paint manufacturers. (M., 26/4/24.) Registered April 2, £20,000 debentures (filed under Sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £5,300; general charge. *£8,500. December 31, 1923.

INDUSTRIAL SILICA, LTD., London, W.C. (M., 26/4/24.) Registered April 8, £5,000 first debenture and £4,383 second debenture, to H. S. Thynne, The Clyst, Hereford, and another and Major A. C. Sayer, Platnix, Westfield; general charge.

ORMSIDE SILICA WORKS, LTD., Redhill. (M., 26/4/24.) Registered March 25, £2,500 debentures; general charge. *£12,500. December 31, 1923.

SPEDOL MANUFACTURING CO., LTD., Brentford. paint manufacturers. (M., 26/4/24.) Registered April 2, £5,000 debentures; general charge. *——. May 2, 1923.

Satisfactions

HOLDEN (ARTHUR) AND SONS, LTD., Birmingham, paint manufacturers. (M.S., 26/4/24.) Satisfactions registered March 26, £3,000 (series of debentures), registered May, 1901; and £500 registered May 3, 1901.

INDUSTRIAL SILICA, LTD., London, W.C. (M.S., 26/4/24.) Satisfaction registered April 3, £15,000, registered July 23, 1923.

Receivership

CHESHIRE GLUE AND CHEMICAL CO., LTD. (R., 26/4/24.) R. E. Clark, of Albion Street, Hanley, was appointed receiver and manager by Order of Court dated April 4, 1924.

London Gazette

Companies Winding Up Voluntarily

HALL'S GLUE AND BONE WORKS, LTD. (C.W.U.V., 26/4/24.) R. P. Baggaley, Armitage Chambers, Victoria Street, Nottingham, appointed liquidator.

LANOLINE EXTRACTORS, LTD. (C.W.U.V., 26/4/24.) H. C. Hankins, 62, London Wall, London, E.C., appointed liquidator. Meeting of creditors at liquidator's office, on Friday, May 2 at 10.30 a.m. This notice is to conform with the Statute only. All creditors have been or will be paid in full.

New Companies Registered

BRITISH ELECTRIC AND GENERAL INSULATORS, LTD., Clare House, Kingsway, London. Manufacturing chemists, paint and varnish manufacturers, importers and exporters of and dealers in all kinds of insulating materials and compounds. Nominal capital, £1,000 in £1 shares.

FILLERS, LTD.—Manufacturers or producers of and dealers in earths, clays, road making materials and ores; chemical, coke and patent fuel manufacturers. Nominal capital, £20,000 in £1 shares (2,000 "A," 10,000 20 per cent. non-cumulative participating preference, and 8,000 ordinary). Solicitors: Francis and Johnson, 62, London Wall, E.C.2.

JACKSON, SPAIN AND CO., LTD., Exchange Buildings, Newcastle-on-Tyne. Manufacturers, agents, and chemical and colour manufacturers' agents. Nominal capital, £1,000 in £1 shares.

MARNS AND EDKINS, LTD., 22, The Green, Ealing, London. Chemists, druggists, drysalters, oil and colourmen, etc. Nominal capital, £1,000 in 900 preference shares of £1 each and 2,000 ordinary shares of 1s. each.

SOZOL (1924), LTD., 20, Copthall Avenue, London. Manufacturers of and wholesale and retail dealers in all kinds of chemical preparations, particularly the preparation known as "Sozol." Nominal capital, £4,500 in 3,000 10 per cent. participating preference shares of £1 and 30,000 deferred ordinary shares of 1s.

TIMMIS AND CO., LTD., Stamber Mill, Stourbridge. Fire brick manufacturers, colliery proprietors and carbonising engineers. Nominal capital, £35,000 in 6,000 5½ per cent. non-cumulative preference and 29,000 ordinary shares of £1.

Catalogues Received

SURFACE TENSION phenomena, as they affect lubrication, are discussed in a popular manner with appropriate diagrams in a booklet just issued by the HENRY WELLS OIL CO., 11, Haymarket, London, S.W.1, who are proprietors of the "Germ" process for treating lubricating oils so that their surface tension is increased. The process claims to give to mineral oils the same lubricating value as the fatty vegetable and animal oils retaining the ability to stand high temperatures. Prices of the oils, given in the booklet, are very moderate.

INDUSTRIAL chemical apparatus of all kinds is described and illustrated in a catalogue issued by W. J. FRASER AND CO., LTD., of Dagenham, Romford, Essex. This catalogue merely summarises the firm's full catalogues which deal with each of the types of apparatus illustrated—viz., stills, deplegmators, condensers, heaters and coolers, mixers, stirrers, autoclaves, driers, pans, tanks, mechanical handling plant, pumps and compressors, valves and cocks, etc. Either the summary catalogue (No. 14, section 1) or the full catalogues will be sent on request to readers.

"THERE is no more logic in men acting as governors in a boiler room than in the engine room," states a foreword to the latest catalogue issued by JAMES GORDON AND CO., LTD., of Windsor House, Kingsway, London, in connection with Cope's patent system of boiler feed control. The unique feature of this system is the scientific manner in which the feed input is regulated proportionately to the steam output. The system may now be applied to Lancashire boilers placed in battery, and the various details and particulars of the system in general are concisely dealt with in the excellently produced catalogue.